the OIL AND GAS JOURNAL

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nks Units NOW Stocked By:

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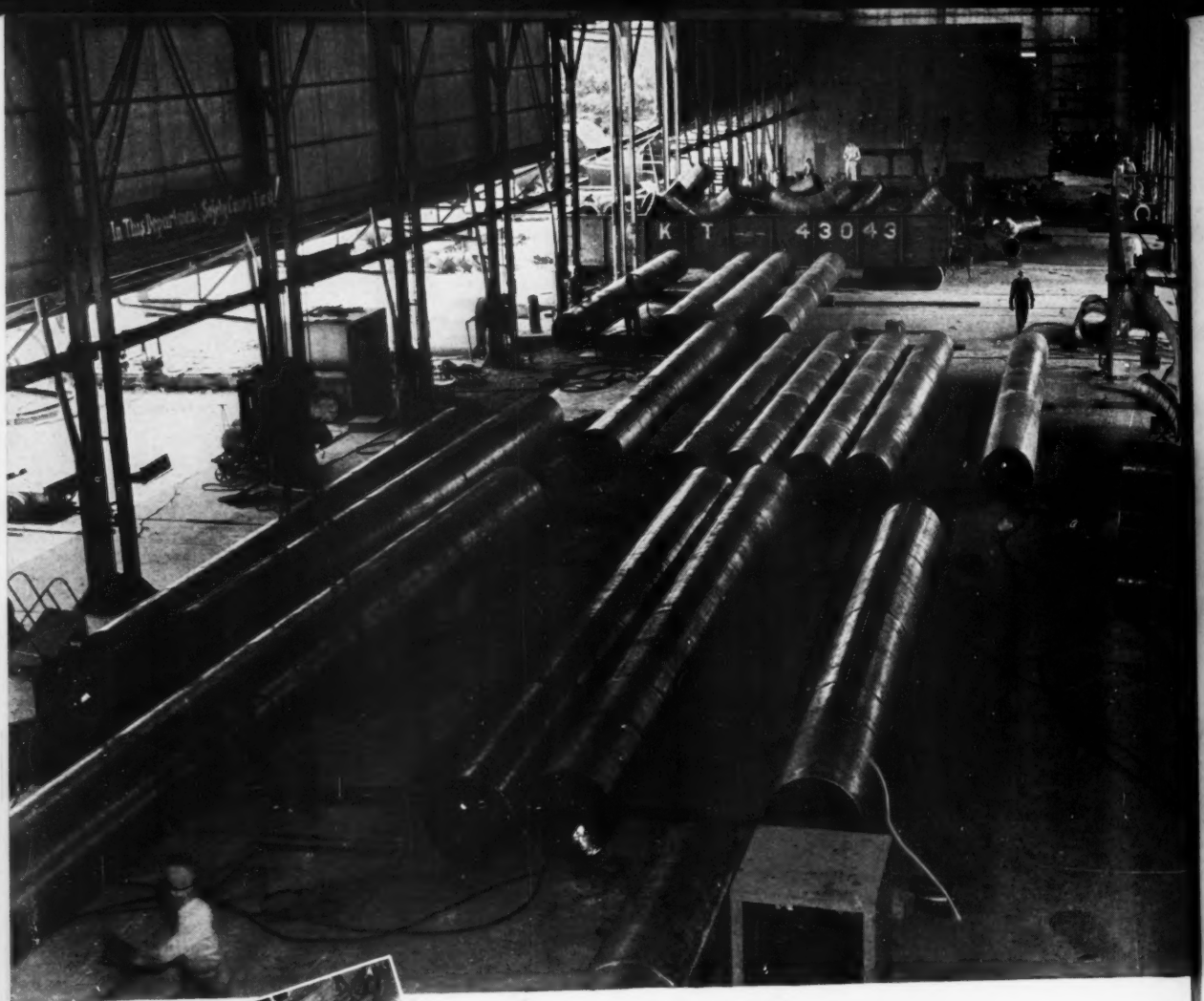
A finger print is never duplicated, although many look alike.

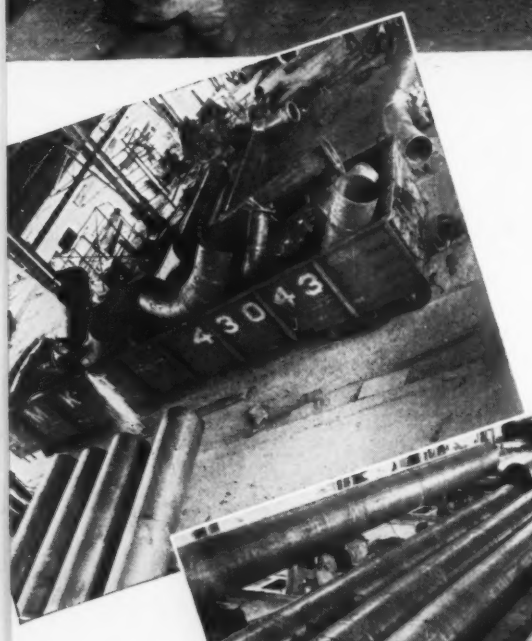
Just so *Franks Telescoper*, the original 100 percent truck-mounted unit with telescoping derrick, has many imitators.

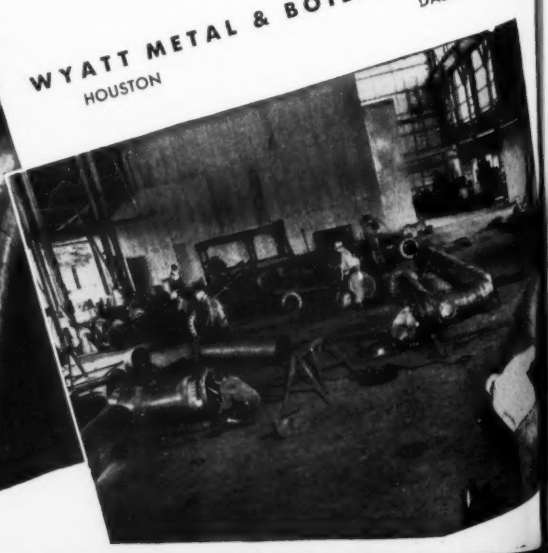
That's why we want to talk turkey about advertising claims. Faster rig-up and teardown; greater speed in moving; lower cost by eliminating individual well derrick and by using truck engine for power; quality, long-life units requiring less maintenance and repair—these are ORIGINAL FRANKS FEATURES which have lost some of their original meaning because of claims by imitators which do not come up to Franks' standards.

To select the best, put the claims of all under the magnifying glass. But don't buy until you've investigated *Franks Telescopers*. Seven models of truck or trailer-mounted units with four sizes of telescoping derrick and with faster, finger-tip ease operation through Franks famous Franksair Telemech air controls. For medium depth rotary drilling, deep workover, and general well servicing.

FRANKS MFG. CORP.
WELL SERVICING AND DRILLING UNITS
TULSA, OKLAHOMA



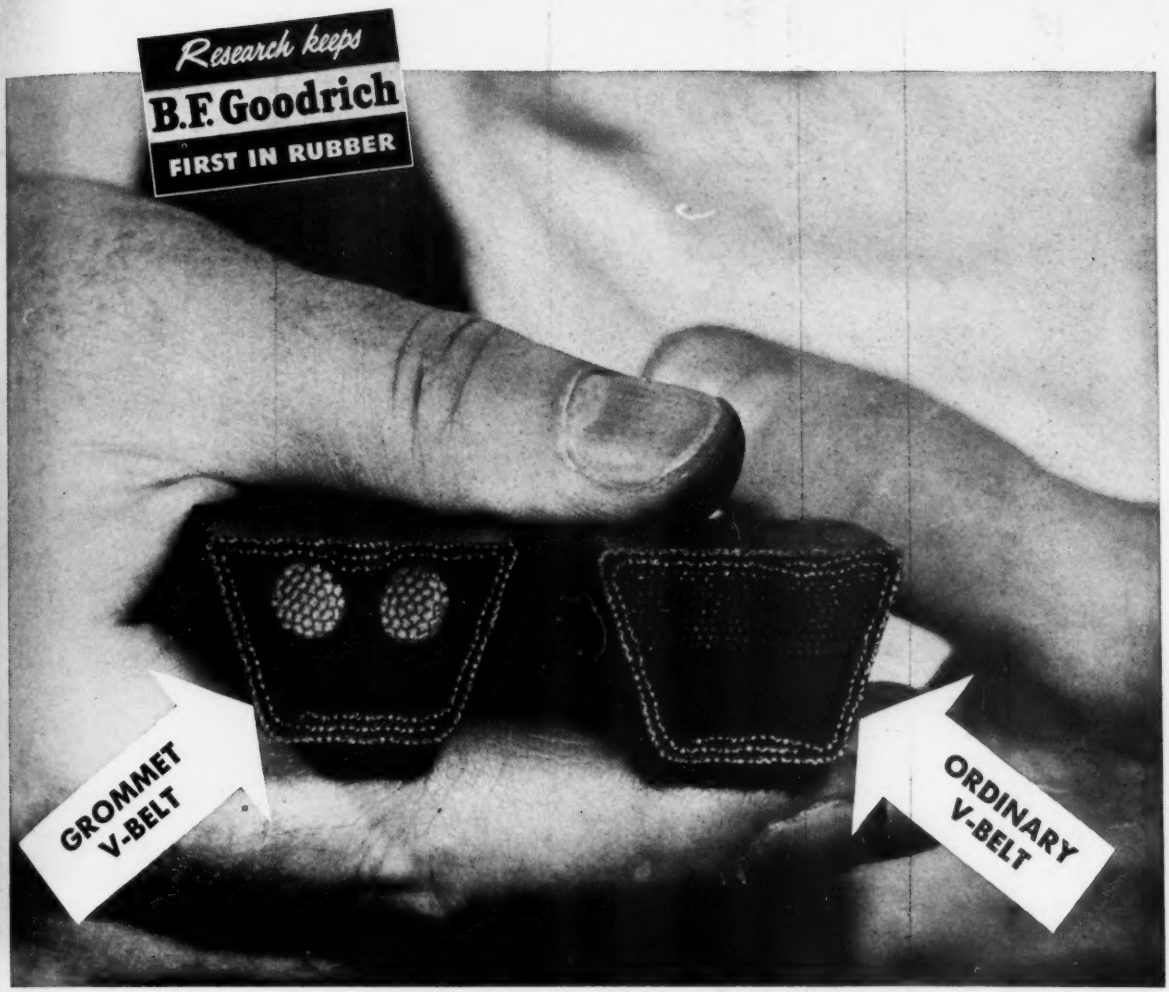




Wyatt's

Fabricated pipe jobs for all types of industries built to your specification.

WYATT METAL & BOILER WORKS
HOUSTON DALLAS



Cut V-belt costs 20 to 50% with new B. F. Goodrich grommet V-belt

Lasts longer, stands shock loads better, costs no more

A NEW patented construction by B. F. Goodrich puts all the cord material in a V-belt to work in the form of twin, endless, extra-flexible grommets — *not* cables — placed close to the driving faces of the belt (see left, above). No "lazy" cords in the interior to shirk their share of the load. Because grommets are endless they are more flexible, with no stiff section such as occurs in an ordinary cable, with spliced or overlapped ends.

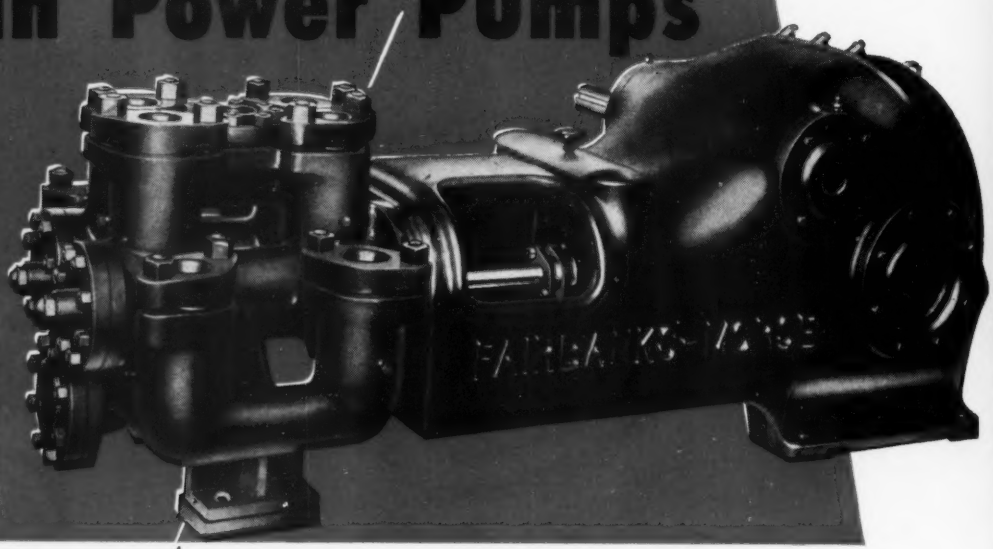
Why twin grommet construction? When an ordinary large-sized V-belt (right, above) goes into the sheave its sides are squeezed by the pulley, forcing the center cords downward and out of the line of load-carrying stress. Belt men call this "dishing", because the cord section becomes concave, like a dish. With twin grommet construction there are no center cords, no "dishing" — as the belt goes into the pulley the grommets remain on the job, close to the driving surfaces of the belt.

Grommet belts take shock load better, last longer — Laboratory and field tests show that grommet belts have a higher safety factor, greater ability to withstand shock load, than ordinary V-belts. Reasons: no "lost" or "lazy" cords to shirk, greater flexibility, better gripping power. Grommet belts tested lasted from 20 to 50% longer than ordinary V-belts. Reasons: no cord overlaps (85% of ordinary V-belts fail in the overlapped section), no sawing cords, less heat.

How to get genuine grommet V-belts — Twin grommet construction is an exclusive, patented B. F. Goodrich development — no other manufacturer can make grommet V-belts. Now available in "D" and "E" sections. To be sure you get genuine grommet V-belts see your B. F. Goodrich distributor. *The B. F. Goodrich Company, Industrial Products Division, Akron, Ohio.*

B.F.Goodrich
RUBBER FOR INDUSTRY

Plus Performance in Power Pumps



The name of Fairbanks-Morse on a power pump is your assurance of *plus* performance . . . of outstanding dependability under all types of operating conditions.

Typical of these ruggedly designed pumps is the 8-Cover Side Pot Duplex Pump illustrated. With enclosed, self-lubricated power end and modern 8-cover side pot fluid end design, this unit is built for efficient, economical handling of water and petroleum products. Where desired, it can be readily adapted for slush service. Large unobstructed fluid passages assure smooth, low velocity flow with minimum frictional losses.

Dependable of course, it's . . .

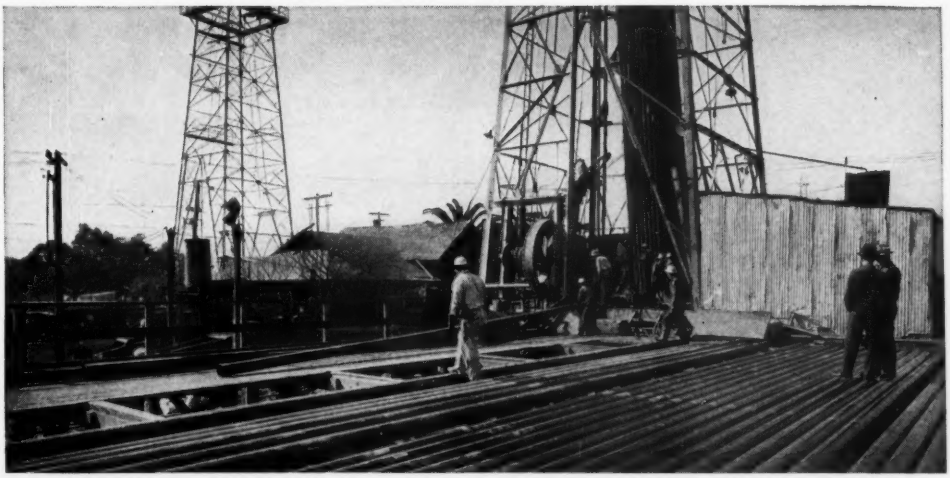
For plus performance on any pumping job, check the complete line of Fairbanks-Morse Pumps. Fairbanks, Morse & Co., Chicago 5, Ill.

FAIRBANKS-MORSE

A name worth remembering

OIL FIELD EQUIPMENT • DIESEL LOCOMOTIVES • DIESEL ENGINES • STOKERS • SCALES • MOTORS • GENERATORS • PUMPS • RAILROAD MOTOR CARS and STANDPIPES • FARM EQUIPMENT • MAGNETOS

DEPENDABILITY



IN A CALIFORNIA FIELD: Running seven-inch S-80 SMITHway Casing.

THROUGH RESEARCH

IN THE A. O. SMITH MILL: Hydrostatic-testing S-80 SMITHway Casing.

SMITH*way* CASING · LINE PIPE

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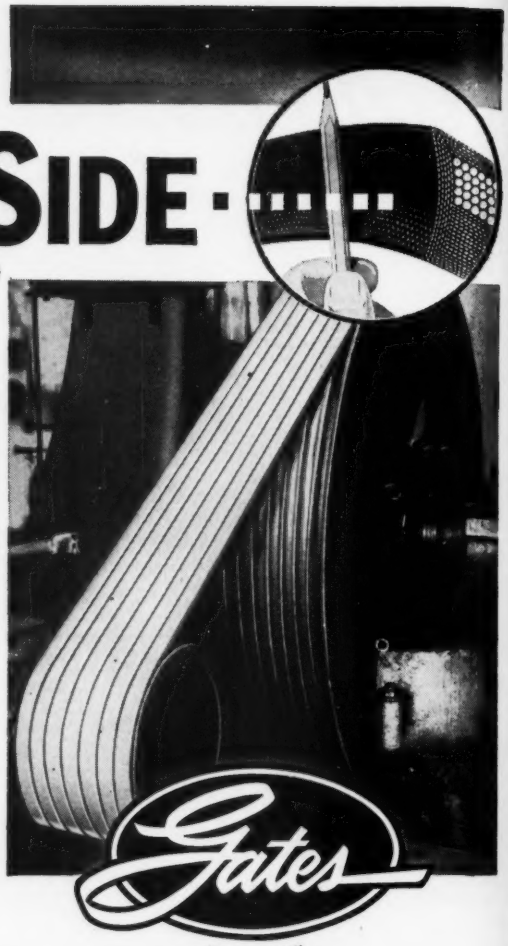
Here is **WHY** *the*

CONCAVE SIDE-

(U. S. PATENT NO. 1813698)



The Mark of SPECIALIZED Research

SAVES You Many DOLLARS In V-BELT Costs!

Every time a V-Belt bends around its pulley, the *top* of the belt is under *tension* and grows *narrower*. The *body* of the belt is *compressed*—causing the *sides* to *bulge out!*

FIG. 1

Because of these stresses, any V-Belt built with straight sides is forced to assume, in the sheave groove, the shape shown in figure 1, on the left.

This forced bulging of a *straight-sided* V-Belt against the sheave groove walls naturally produces excessive wear along the *middle* of the belt's sides—as indicated by the arrows. Also, because the full side of the belt does not *uniformly* grip the pulley, there is a definite loss in drive efficiency.

Now see the difference when you bend the V-Belt that is built with the precisely engineered Concave Side (U. S. Patent No. 1813698)—the Gates Vulco Rope.

FIG. 2

As the Gates Vulco Rope bends, its Concave Side becomes straight (Figure 2). It exactly fits the sheave groove—and this gives you two very definite savings:—

(1) No out-bulge of the sides means uniform side-wall wear—*longer life!*

(2) *Full side-width* grip on the pulley carries heavier loads and sudden load increases without slippage—saving your belts and saving power too!

The Concave Side is MORE IMPORTANT NOW Than Ever Before!

Because the *sides* of a V-Belt are what actually *drive* the pulley, it is clear that any increased load on the belt means a heavier load that must be transmitted to the pulley *directly* through the belt's sidewalls.

Now that Gates SPECIALIZED Research has made available to you *SUPER* Vulco Ropes—carrying fully 40% higher horsepower ratings—the life-prolonging Concave Side naturally delivers greater savings today than ever before.

4810

GATES VULCO ROPE DRIVES

Engineering Offices and Jobber Stocks IN ALL INDUSTRIAL CENTERS of the U. S. and 71 Foreign Countries

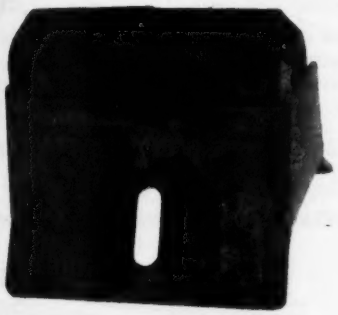
THE GATES RUBBER COMPANY
DENVER, U.S.A.
"The World's Largest Makers of V-Belts"

ONE STRIKE and you are OUT!

unless your Traveling Block and Rig is PROTECTED

with a Patterson-Ballagh Traveling Block Bumper

A "BOBWHITE" Bumper on an Oilwell 66"-5 Block



A Traveling Block Bumper, which was run into the crown. Only the Bumper rubbers are broken. Neither crown or traveling block suffered damage. Here is an item that cost about $300 and saved many thousands in lost time and replacement of damaged equipment. All that had to be replaced were two inexpensive Bumper Refill Rubbers.

YES, you are out both time and money if your unprotected Traveling Block ever smashes into the crown. Records show that they are run into the crown... once in a while. If it's only once in the lifetime of a rig, the time lost and the cost of repairs may spell the difference between profit and loss. A Patterson-Ballagh Traveling Block Bumper installed on your rig is the wide margin of safety that may keep you from putting out money for costly repairs and save you valuable drilling time.

With the skill and teamwork of drilling crews, it seems impossible that the Traveling Block would ever crash into the crown, but when over 100 tons of block and pipe are speeding toward the crown in the pitch black of night and the lights on the derrick are playing tricks with distance, a split-second difference in timing will mean that the block will crash into the crown. *Don't* let a *strike* like that put you *out* of the money.

There are 58 individually designed Patterson-Ballagh Traveling Block Bumpers that will fit most standard three to six sheave blocks. If you use a Regan, Nasco-Ideal, Emsco, Owsco, Ideco, Wheland-Lucy, Baash-Ross, Brewster, Bethlehem, Beaumont, or McKissick Traveling Block, your Bumper can be installed quickly and securely on its top. There, the large rubber cylinders soften and absorb the shock of accidental crashes with the crown. See pages 3464 and 3465 of the 1948 Composite Catalog for complete information and then order a "Protection Proven" Patterson-Ballagh Traveling Block Bumper for your rig today!

PATTERSON BALLAGH · SEAL OF QUALITY · OIL FIELD SPECIALTIES

Specify "PROTECTION PROVEN"

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DIVISION OF BYRON JACKSON CO.

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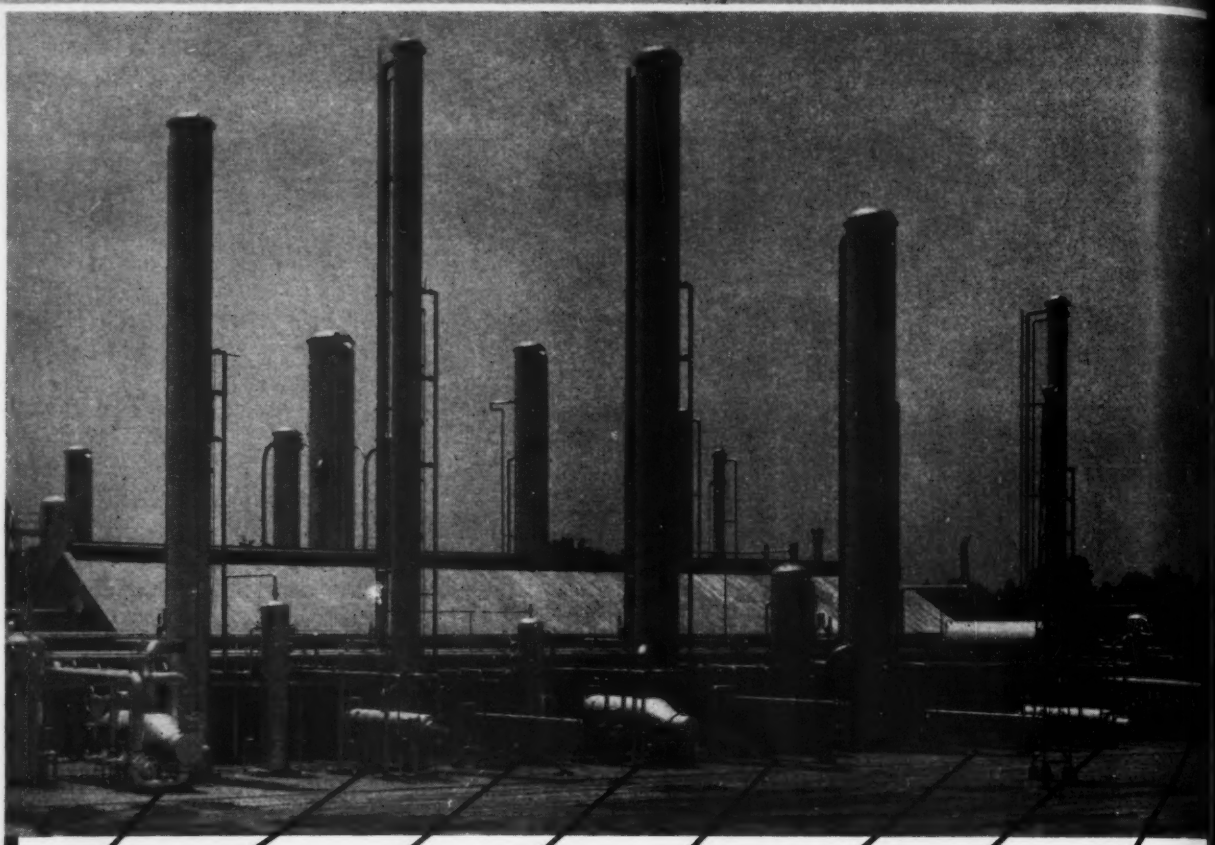


OIL HEATED KEROSENE FRACTIONATOR REBOILER

DE-PROPANIZER REBOILER

TWIN G-FIN DE-PROPANIZER EXCHANGER

DE-BUTANIZER REBOILER

TWIN G-FIN SECTION DE-BUTANIZER BOTTOMS EXCHANGER

TWIN G-FIN SECTION FRACTIONATOR FEED EXCHANGER

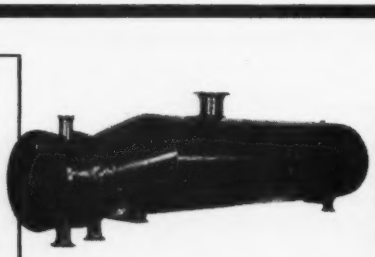
DE-ETHANIZER REBOILER

TWIN G-FIN SECTION BOTTOMS EXCHANGER

This portion of a large modern south-western natural gas absorption plant contains the G-R apparatus listed above. The plant also contains 60 G-R Bentube Sections and a large number of G-R Tubular Heat Transfer Apparatus not shown in the illustration.

G-R REBOILERS

For producing vapor from liquids heated with steam or hot liquids. The illustrated kettle type has a large vapor space above the tube bundle.

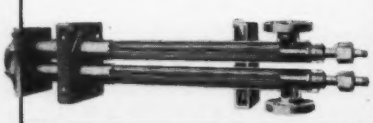


G-R BENTUBE SECTIONS

Patented design of atmospheric or submerged cooling and condensing sections consisting of parallel rows of tubing set with slight initial bow into cast header at each end. Change in temperature causes corresponding change in curvature of the tubes which cracks up and breaks off scale.

G-R TWIN G-FIN SECTION

Standard, interchangeable units of patented hairpin design, consisting of a single G-Fin element, with longitudinal fins within a shell. More than 40,000 of these units are used on practically every heating, cooling or condensing service.



G-R TUBULAR EXCHANGERS

Include many patented features based on 80 years of experience in building heat transfer apparatus. Available in a wide range of types for condensing, heating, cooling or exchanging heat between liquids, gases and vapors.

GRISCOM-RUSSELL: PIONEERS IN HEAT TRANSFER APPARATUS

A good example of G-R "RANGE-ABILITY" at this plant

"RANGE-ABILITY"... the ability to serve efficiently through a wide range of service requirements . . . is a characteristic of G-R Heat Transfer Apparatus.

For example, in G-R Twin G-Fin Sections, this "RANGE-ABILITY" is obtained by simply connecting, in series or parallel, as many of these standard, interchangeable units as required by the duty. The accompanying photograph is a good illustration. This modern natural gas absorption plant uses four banks of G-R Twin G-Fin Sections as follows:

De-propanizer Exchanger — 3 sections connected in series

De-butanizer Bottoms Exchanger — 3 banks in parallel, each bank containing 4 sections in series

Fractionator Feed Exchanger — 2 sections connected in series

De-ethanizer Bottoms Exchanger — 4 sections connected in series

The same plant uses 60 G-R Bentube Sections (not shown in the illustration) for cooling tower service. These sections are another example of G-R "RANGE-ABILITY" obtained through standard designs, and are operating at pressures ranging from 125 psi to 2750 psi in this plant.

In other types of G-R apparatus, "RANGE-ABILITY" is obtained by designs which cover all duties. For example, the accompanying photographs also show various types of steam-heated and oil-heated reboilers; and the same plant is using many other designs of G-R Tubular apparatus as still feed preheaters, vapor condensers, oil-to-oil exchangers, gas heaters, gas coolers and aftercoolers.

No matter what may be your heat transfer requirements, be sure to consult Griscom-Russell for authoritative ratings and exactly suitable designs of proven performance.

THE GRISCOM-RUSSELL CO. 285 MADISON AVENUE, NEW YORK 17, N. Y.

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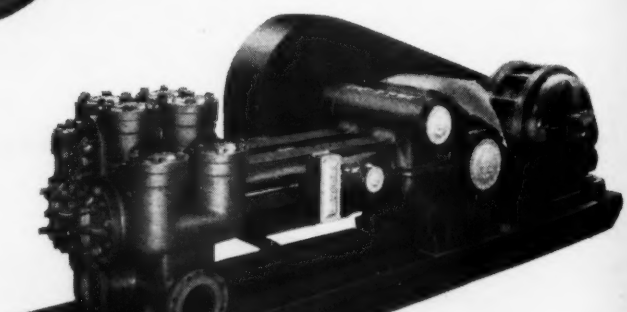
GRISCOM-RUSSELL

GASO

OFFERS 100 MODELS AND SIZES TO FIT EVERY NEED EXACTLY

The more precise the fit, the better the performance. To assure a pump that fits your conditions *exactly*, we offer Gaso Pumps in 100 models and sizes, one of which is certain to suit the specifications of your engineers to a T-square! Still another reason why you get more for your money when you specify Gaso Pumps.



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GASO PUMPS
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Core Lab's service of quick-freezing cores is one of the most valuable operating assets ever provided the petroleum industry.

It is the only practical method by which the fluid content of core samples can be preserved almost indefinitely.

The use of Frozen Cores puts reliable and accurate core analysis within economical range of every drilling site.

This service is especially useful where immediate core analysis is not needed to direct coring, testing, or completion.

Core Lab's special freeze boxes can be placed on location by either a Core Lab engineer or a company man.

By following simple prepa-rations, samples are quick-frozen easily and delivered to the nearest Core Lab base point.

Within a few hours an accurate Off-Location Analysis is made and On-Location results transmitted back to the well.

frozen assets

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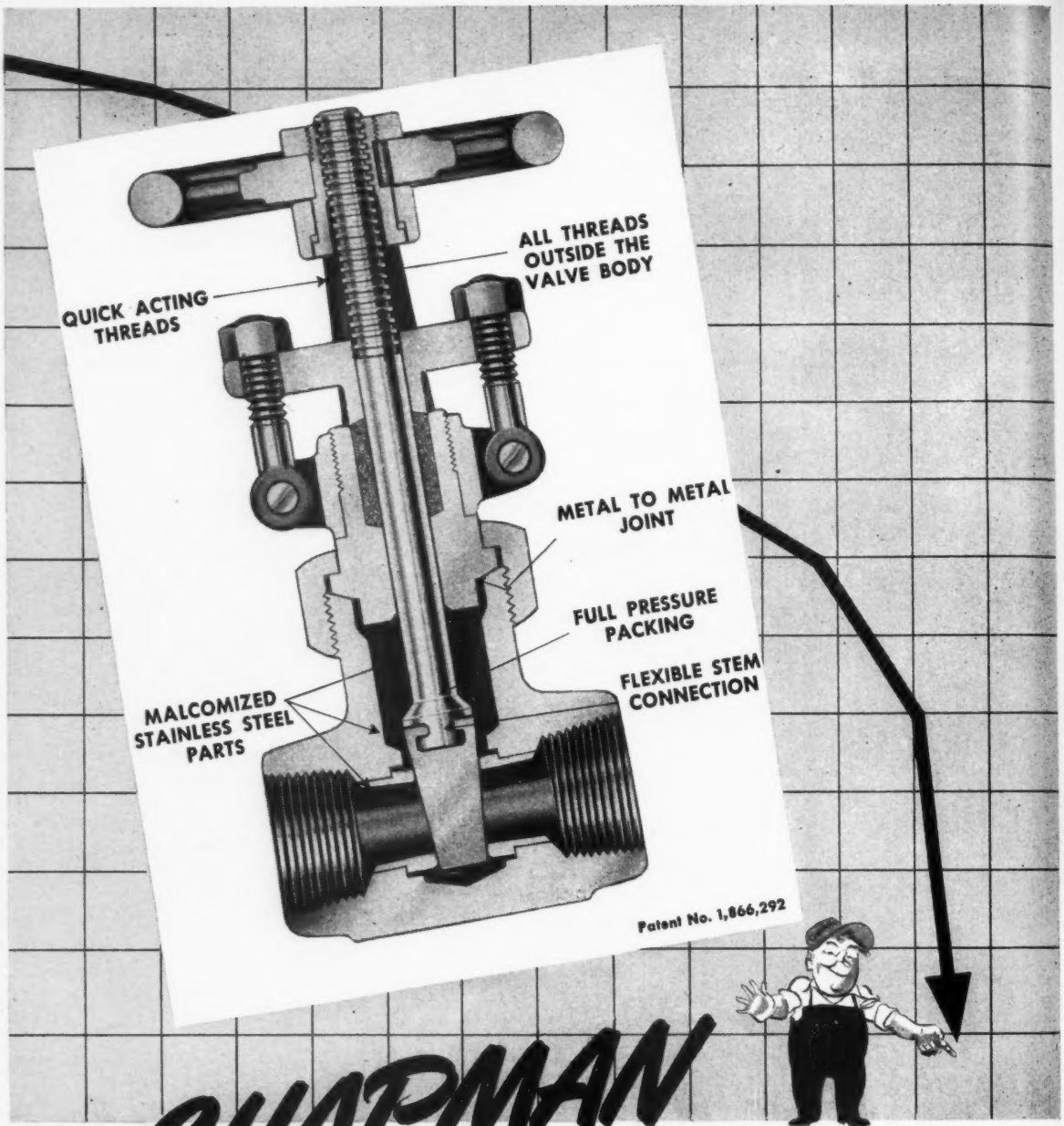
"If it's worth coring, it's worth analyzing."

CORE LAB

PETROLEUM RESERVOIR ENGINEERING



CHAPMAN LIST 960

. . . the valve that reduces maintenance and replacement costs

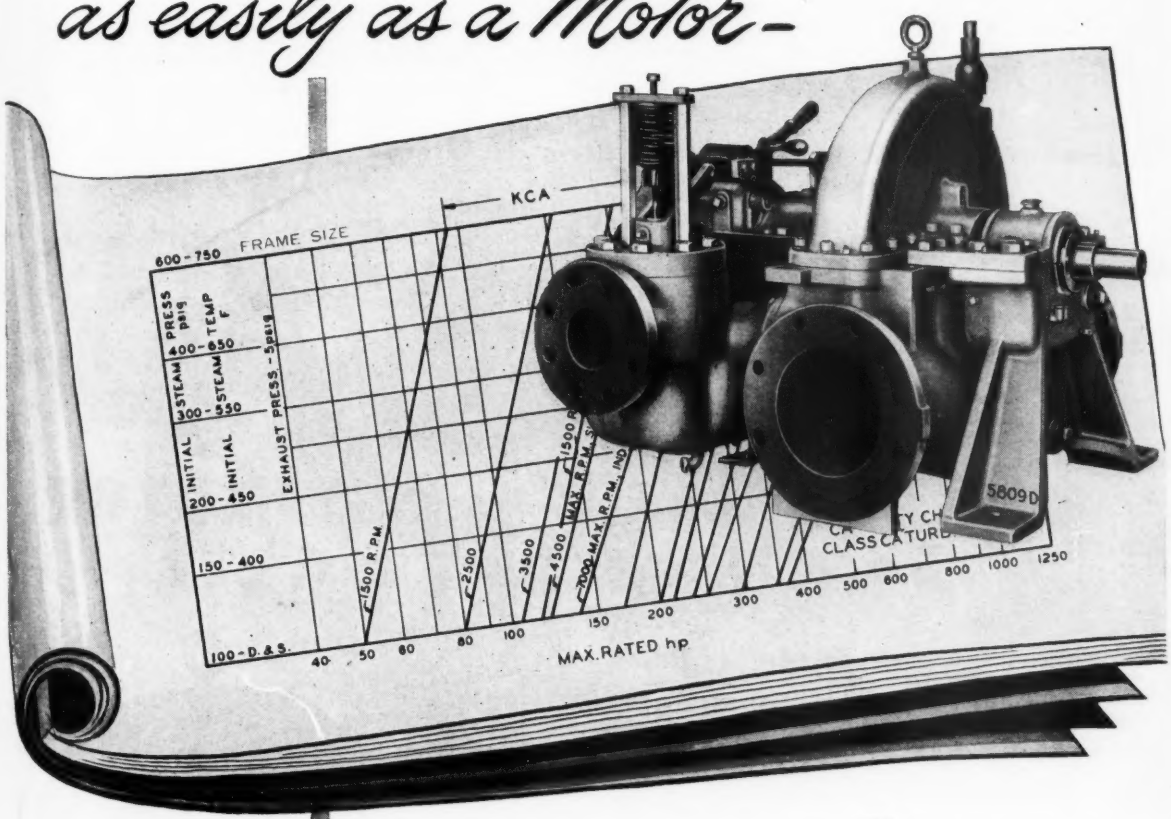
Chapman built this sturdy gate valve to practically eliminate your maintenance and replacement problems. That's why we put stainless steel in seats and plugs . . . forged steel in body and yoke. And why we protected yoke threads against rust and corrosion . . . made repacking possible under full pressure.

For a better valve buy—specify the List 960. It's available in sizes from ¼" to 2" . . . carbon steel for pressures to 800 pounds; alloy steel for pressures to 1000 pounds at 750° F. For higher pressures, specify List 990.

The Chapman Valve Manufacturing Company
INDIAN ORCHARD, MASSACHUSETTS

Now YOU CAN SELECT A TURBINE

as easily as a Motor–



SIMPLIFIED RATINGS FACILITATE SELECTION OF NEW DE LAVAL MECHANICAL DRIVE TURBINES

Because of the great demand for the reliability, speed variability and economy inherent in mechanical drive steam turbines, the De Laval Steam Turbine Co. has designed a new standardized line of velocity stage turbines, manufactured these units in quantity for prompt delivery, and published simplified rating tables that make the preliminary selection of the right turbine size as easy as the selection of an electric motor.

Send for catalog describing the new and improved De Laval Class CA velocity stage steam turbine for mechanical drives.

DE LAVAL

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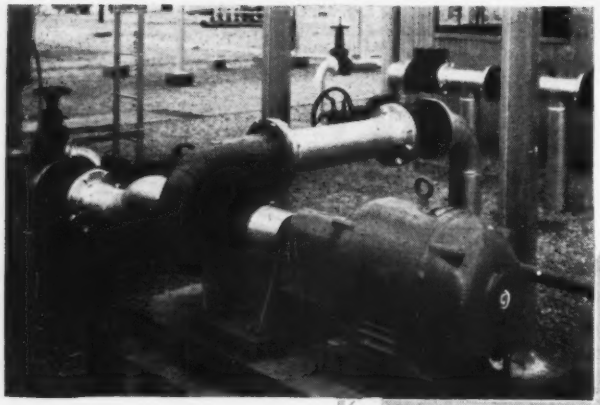
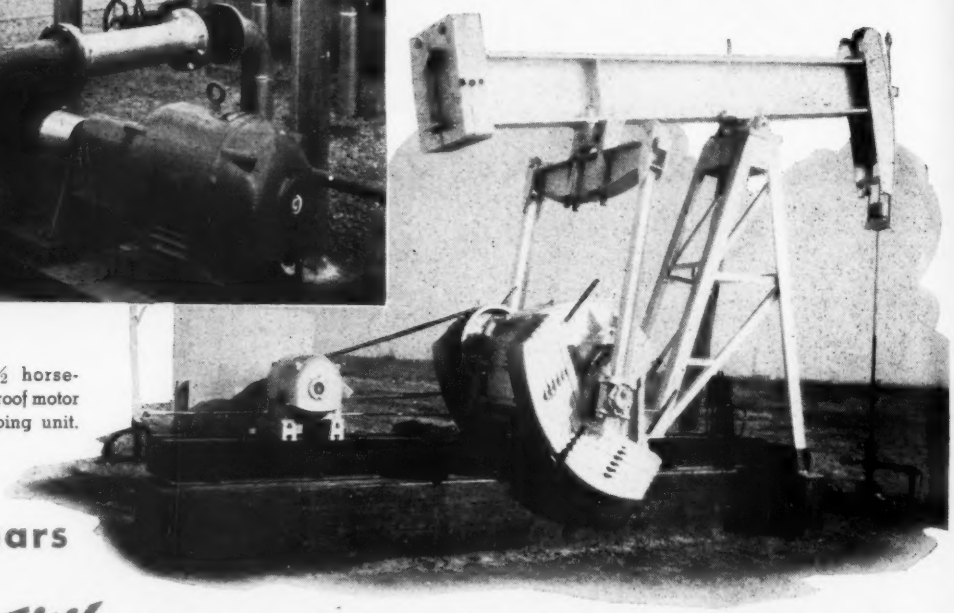


• Century 10 horsepower Splash Proof motor drives an unprotected booster pump.



• Century 7½ horsepower Splash Proof motor driving a pumping unit.

For 17 Years

Century SPLASH PROOF MOTORS

Have Satisfied the Requirements of the Oil Industry

Installed Out of Doors

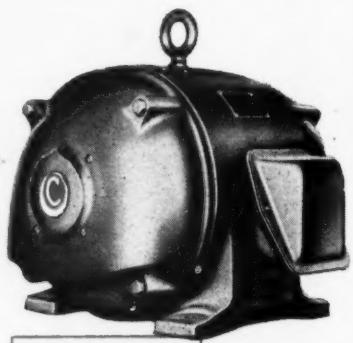
Subjected to Rain, Snow, Sleet, Ice, Heat

Century Splash Proof Motors have been exposed to the elements in all climates of the world with satisfaction to their users for oil pumping — on locks and dams, irrigation, etc.

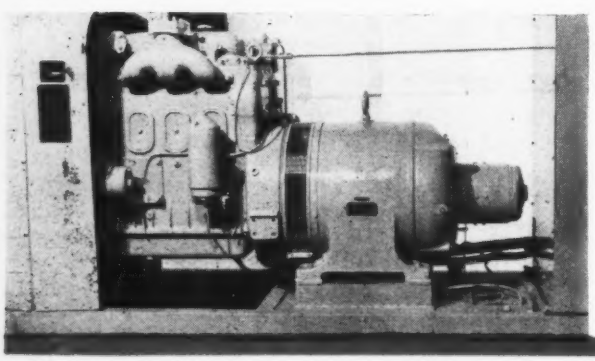
For pumping units, Century Splash Proof type SCT motors also save wear and tear on equipment. Their "high slip" cushions the impact of the peak load and reduces the sudden shock.

Century builds a wide range of motors from 1/6 to 400 horsepower for oil pumping, circulating and transferring petroleum products and other producing and refining operations.

Specify Century Motors for all your electric power requirements. You can get complete information at your regular supply store.



Century C MOTORS



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Offices and Stock Points in Principal Cities

Century Type ARC Generator

Where public service current is not available, Century Generators will provide adequate, continuous electric power. Depending on the load per motor and the size of generator, from 10 to 30 wells can be operated from one generator. They provide a dependable source of oilfield power.

-594

FROM LONDON

A Shell Photograph

TO CARDON

FOR...

. . . SHELL'S CARDON REFINERY, VENEZUELA

NOW BEING BUILT

BY LUMMUS

A Shell Photograph

Typical of the scope of Lummus foreign operations is the construction of a refinery at Cardon, Venezuela, by The Lummus Company of New York and Compania Anonima Venezolana Lummus for The Shell Oil Company of Venezuela. Most of the fractionating equipment, like the hundred ton tower shown on the preceding page, was fabricated in England and Holland, and transported to Venezuela. Staffed offices in London and Paris give Lummus an added flexibility in operation and the advantages of wide purchasing contacts.

In oil producing states in America, all through Europe, in the Near East, Netherlands Indies, South America, China — Lummus has built more than 150 gasoline refineries, upwards of 90 process units for solvent refining and dewaxing of lube oils and more than 300 chemical units, including complete plants of ethylene, butadiene, styrene, phenol.

THE LUMMUS COMPANY
420 Lexington Avenue, New York 17, N. Y.

LUMMUS

***CHICAGO*—600 South Michigan Avenue, Chicago 5, Ill.**
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NATIONAL PETROLEUM CONSTRUCTORS ASSOCIATION — OIL STEEL CHEMICAL

AXELSON FIRST CHOICE

PURCHASING AGENTS AGREE, when they place the name "AXELSON" on a sucker rod purchase order, they have specified unquestioned reliability and assured performance. PA's know there is no better sucker rod than an Axelson, because they are manufactured by the company who pioneered every major improvement in the field of sucker rod design and they don't cost a penny more "spec-for-spec."

HALF-A-CENTURY OF CONFIDENCE is behind the name AXELSON . . . Manufactured in a factory devoted *exclusively* to production of sucker rods . . . under rigid laboratory control . . . by an organization noted for their ability to obtain the highest physical properties from the best sucker rod steels.

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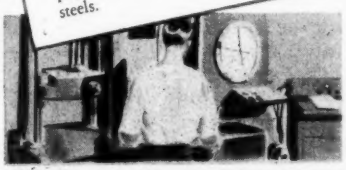

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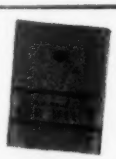

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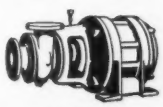

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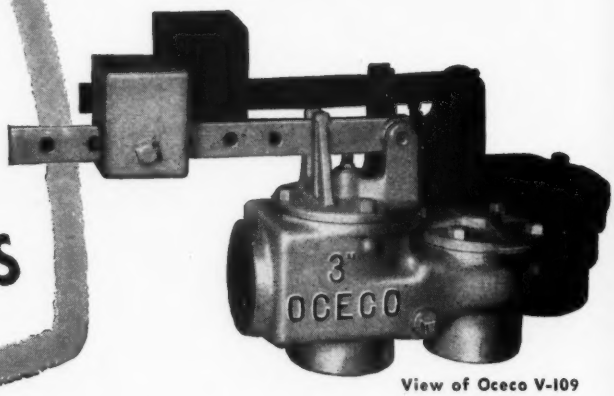

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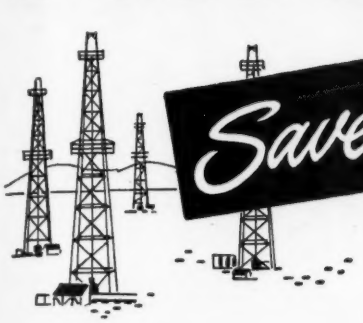

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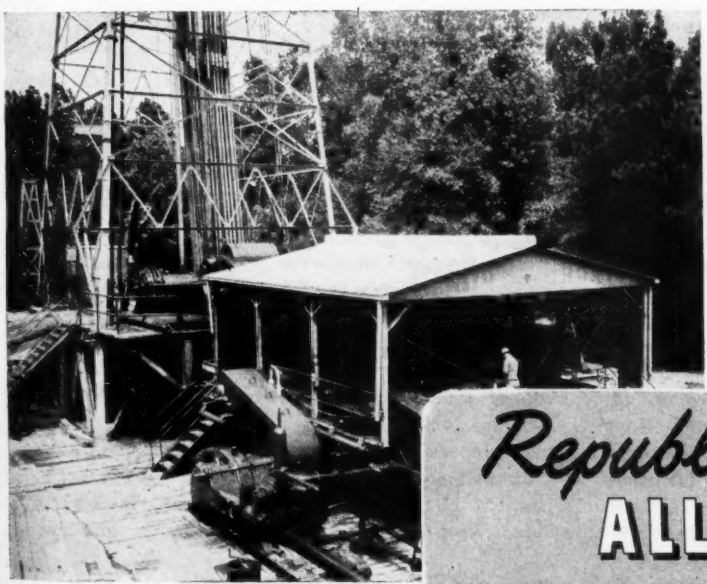

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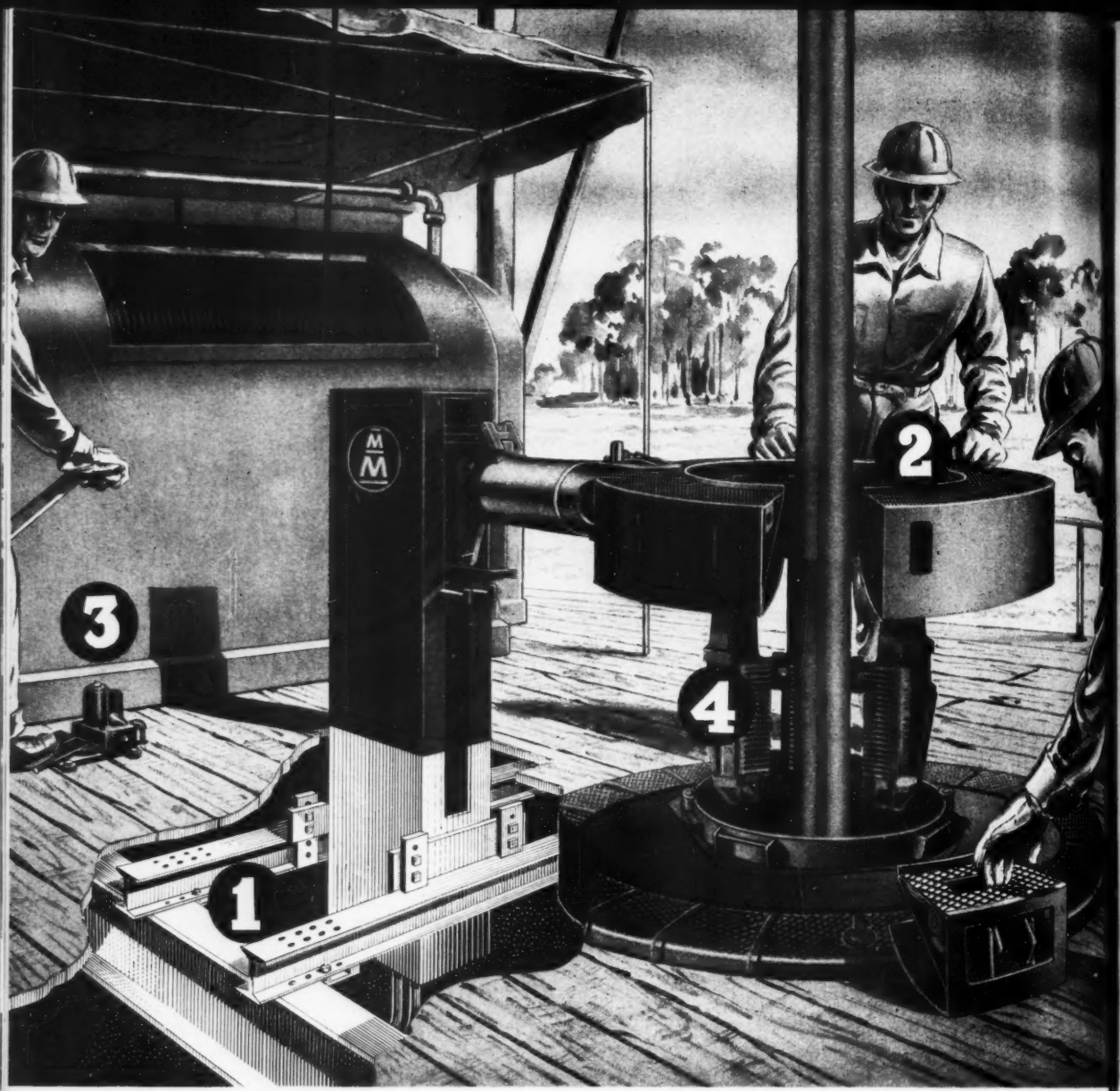

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JOURNALLY Speaking

Climatic Footnote

RIGHT in the middle of last summer our Houston crew sent in a news memo about Arabian American Oil Co. opening an office in that city to recruit oil men for jobs in Saudi Arabia and quoting the office manager as saying:

"Your climate here, and in the whole Southwest area, is so much like that in Arabia that the change could be made without difficulty."

The reaction of the Houston Chamber of Commerce was not given, and perhaps it would not have been suitable for publication in our favorite oil paper anyway. Those of our staff who have visited Saudi Arabia in the summer have expressed a decided preference for Tulsa, even though our local Chamber of Commerce does not boost the place as a summer resort.

However, our suspicious mind detected a note of sadistic irony (meaning a dirty dig) in the fact that the quotation was attributed to V. A. Walker who, the item said, had just been moved to Armaco's new Houston office from Tulsa.

To prove that we are not taking part in any climatic controversy between the boosters of these two oil centers, we hasten to add that our business office utterly ignored the appended request of our Houston staff to draw tropical pay for having to endure the Arabian-like balminess of the Gulf Coast.

Petrophilately

A CAMPAIGN to have the Government issue a postage stamp honoring the oil industry on the ninetieth anniversary of the Drake well next August is being conducted by the Pennsylvania Grade Crude Oil Association.

To help the cause along John P. Herrick, an independent producer at Olean, N. Y., and undoubtedly a stamp collector himself, contributes the information that 15 foreign countries have issued oil stamps. Other oil men who are philatelists probably have these in their albums already, but for those who aren't we pass on Brother Herrick's list: Austria, Czechoslovakia, Iraq, the Netherlands, Romania, Russia, Argentina, Bolivia, Brazil, Colombia, Curacao, Mexico, Peru, and Venezuela. Venezuela, he says has issued 14 stamps bearing oil scenes, but the record is held by Azerbaijan, a Soviet Russian republic, which put out 26.

Volcanic Advertising

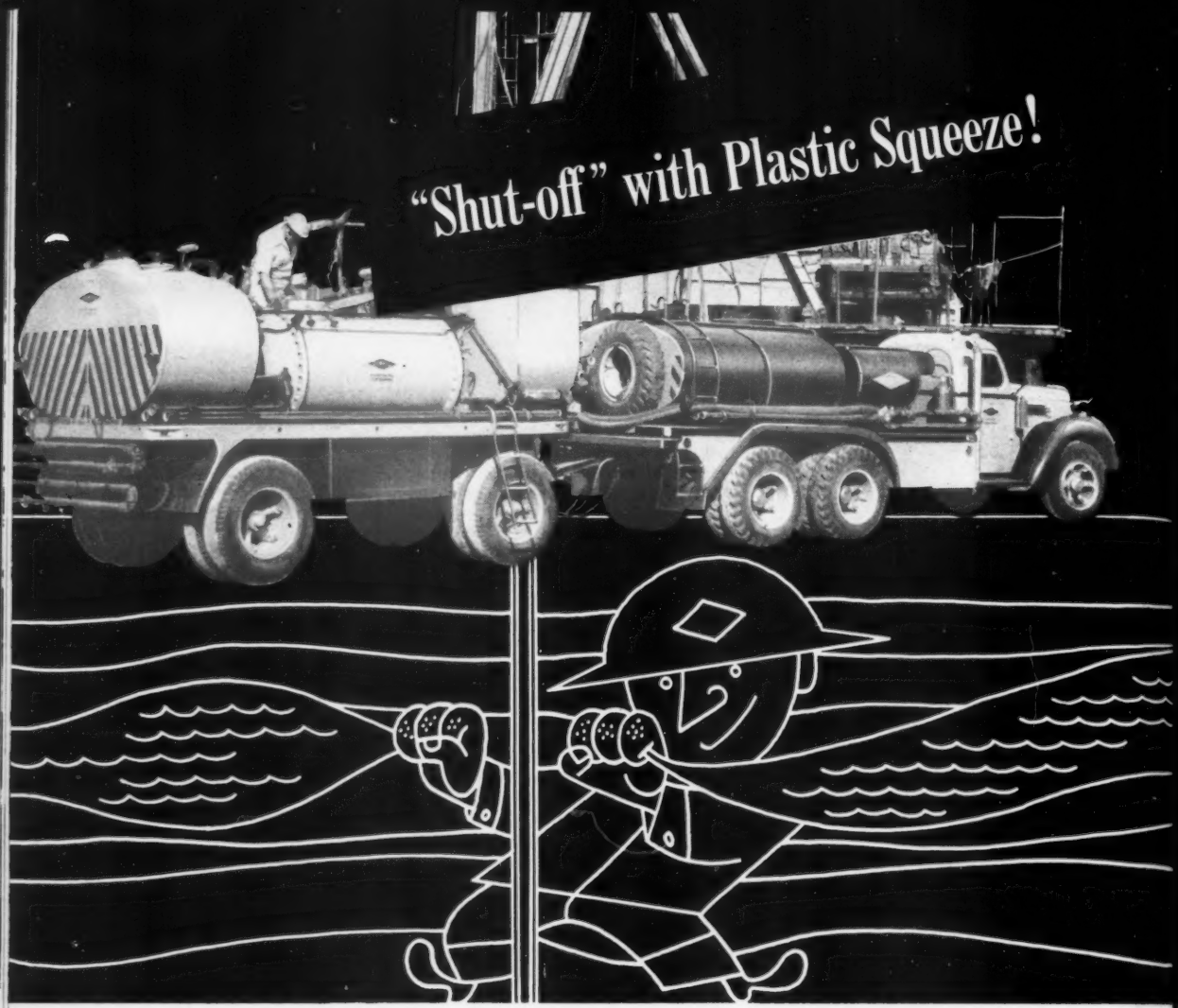
NATURE is playing one of her wry jokes on Union Oil Co. of California.

As proved by a (presumably unretouched) photo in the company's September house organ "On Tour," Mt. Shishaldin, an active volcano on Alaska's Unamax Island, is erupting a flow of lava in the form of a perfect "76" on its snow-capped peak. But why, oh, why, did nature have to post Union's trade mark where it can be seen only by a few tramp steamships and not a company filling station within 1,000 miles?

The Buckle's Week

OIL Progress Day was marked pretty much throughout the country and with considerable success, but that wasn't enough for the city of Duncan, Okla., which held an Oil Appreciation Week November 15-18. The local Chamber of Commerce and other civic groups teamed up to stage a humdinger appreciation, which, according to the advance billing, included the best features of all the Oil Progress Day celebrations rolled into one. It's nice to see that at least one community really shows its esteem of the industry.

Duncan, incidentally, calls itself "The Buckle on the Oil Belt." With the oil industry so widespread the word "belt" would hardly seem properly descriptive, but we presume this slogan gives the Duncan Chamber of Commerce the opportunity to serve as the tongue.



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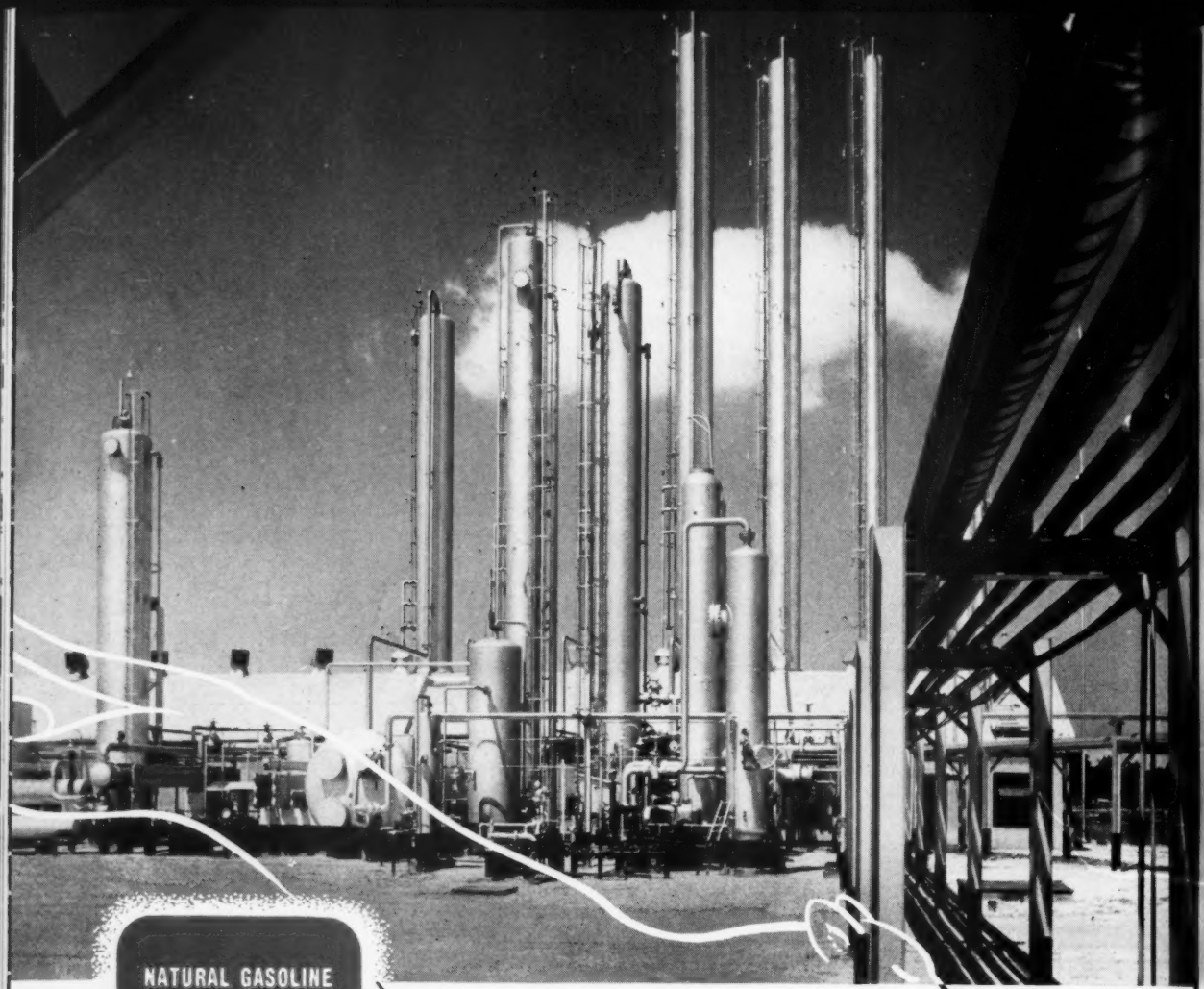

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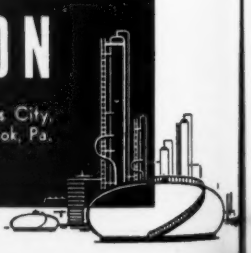


Crude Oil, Natural Gasoline and Liquefied Petroleum Products

THE OIL AND GAS JOURNAL

Washington Is Normal

WASHINGTON.—Last week we attended the national conference of business papers here. These are held at regular intervals during the year for the purpose of giving publishers and editors a background of what is happening in Government of importance to business. Leaders of Congress and the administrative branches, diplomats, and an assortment of government experts appear on the programs, which occasionally include an interview with the President.

Of outstanding interest to practically all business-paper representatives was the status of government planning in regard to the ending of basing points and the establishment of mill points in pricing. As explained elsewhere in this issue, there is reason to believe that this industry is on the agenda of the Federal Trade Commission for action in the application of this policy to the merchandising of petroleum products.

Probably no more confusing development has ever arisen in the relations of Government and business than this FTC program, largely arising from the rulings and observations of the U. S. Supreme Court in handing down a decision involving a violation of the antitrust acts in the cement industry. The net result is that FTC is now prepared to enforce regulations, the full import of which the commission itself is not in full agreement.

It is assumed that clarifying legislation restricting the commission in the exercise of the new powers obtained from the judiciary and not Congress will be enacted. Trade editors, however, point out that oftentimes the help needed by business in matters such as this never materializes.

In matters affecting both domestic and international business one is impressed by the importance of the Economic Cooperation Administration as explained by government representatives, including those of foreign countries. There have been failures in the application of our postwar foreign policy of aiding friendly nations to recover from war devastation, but there are accomplishments to point to. The stakes are large, and future trends in our national and world economy, to an important extent, are tied in directly with the success or failure of our existing foreign policy.

Always at a conference of this type some speaker points out that business management is on trial. In this case a Senate leader stressed the trends toward socialized industry in other countries as a warning as to what will happen here if private business fails in its supposed duties. It never seems to register with these politically minded business critics that labor and all the beneficiaries of our system of doing things, including Government itself, have a stake and responsibility in the crises that arise time to time.

All of which indicates to us that conditions at Washington are quickly returning to normal.

Federal Trade Commission Preparing To Attack Group 3 Gasoline Pricing

by Bertram F. Linz

WASHINGTON.—Refiners and other sellers using what is termed the "Tulsa Group" or "Oklahoma (Group 3)" railroad tariffs in the sale of petroleum products will shortly be cited by the Federal Trade Commission and asked to discontinue the practice, according to reliable reports here this week.

The FTC action will be designed to end a practice which is as old as the refining industry of the Mid-Continent and Middle West. The Tulsa Group was formerly known in rail tariffs as Oklahoma (Group 3) and the latter designation is still generally used in refining and marketing circles.

The area includes all of Oklahoma as a point of origin in shipments east and north. In actual practice the use of the Group 3 base in quotations is generally confined to Middle Western states west of the Mississippi River and the other Middle West states west of Ohio and north of the Ohio River. Rail tariffs on shipments, from Group 3 to the Middle West are the same for the same class of products. It has been customary for many sellers outside Oklahoma to use the Group 3 rates in sales to buyers within the Middle West area.

Cement Case Is Key

Taking the Supreme Court decision in the Cement Institute case as an unrestricted hunting license, the FTC reportedly is preparing to launch a vigorous campaign to bring about universal adoption of f.o.b.-plant prices, with the buyer to pay the transportation cost, which will affect every industry and every consumer in the country.

A number of cases involving a variety of forms of delivered pricing are pending before the commission, of which the Group 3 system is only a single instance. Although the Supreme Court did not definitely indicate that it would extend the principles confirmed in the cement case to go as far as the FTC desires, there are a few who now believe that the courts would overturn any case in which the commission finds that a form of delivered pricing is illegal.

The commission has been gunning for the oil industry over a period of years, but only in the recent action of the Supreme Court has it found a jumping-off place for attack. Primarily, the commission has viewed the oil industry with suspicion because of the fact that all filling stations in a given area customarily quote exactly the same price for gasoline and all fuel-oil dealers in an area have the same price for heating oils.

While the industry contends that identical prices are the result of competition, which makes it impossible for one seller to ask more than his competitors, it is the position of the commission that identical prices, however reached, are illegal per se. Going still further, some commission authorities contend that identical prices in themselves indicate "knowing parallel conduct" and therefore come within the field of conspired prices.

"Pattern" Pricing Illegal

The commission, except for one member, appears to have dropped entirely the concept that price systems are illegal only when they result from conspiracy, and in a recent memorandum to the staff it was held that while any producer, acting individually, may adopt any system of delivered pricing that he desires, without acting illegally, should his competitors adopt the same system to such extent that it becomes a "pattern" for his industry it becomes illegal, not only for those competitors but also for its originator.

In its memorandum, the commission made some comment which will be of interest to the oil industry in view of the expected proceedings against Group 3 prices:

"The inherent evidence of collusion in the characteristics of some zone-pricing formulas is similar to that in basing-point systems. A concern which quotes uniform prices over a given area and establishes differentials from one area to another must necessarily maintain a sharp definition of boundaries between areas and must necessarily face problems of leakage along the boundary wherever a high price and an appreciably lower price are made available to customers at nearby points."

"A desire for identical delivered prices explains the common adherence to unnatural zone boundaries, the common adoption of otherwise unexplained differentials between zones, and the common willingness to accept difficulties of leakage at the boundaries."

Accordingly, it held, "zone-price systems used by competitors which result in identical delivered prices, the features of which upon examination of the facts appear to be inconsistent with separate and independent decision to adopt them" are "open to question."

Two weeks of hearings by a Senate subcommittee have failed to clarify the situation created by the Supreme Court decision, but have shown up the differences of opinion as to the effect of that decision that prevail even within the ranks of the administration.

The hearings, in suspension this week, will be resumed November 29 when, for the first time, the subcommittee will hear from the oil industry. Conflicting views also appear to be held in the industry, with some companies seeing nothing in the decision to threaten their particular pricing systems, while others believe it will be necessary to make all sales on an f.o.b. refinery basis.

Exchanges Pose Problem

One question which has been raised in the industry is what effect the decision might have on exchanges of product, which in the past have been viewed by both the Department of Justice and Federal Trade Commission as perfectly proper. As in the case of the steel industry, where a customer paid the price quoted at a basing point, plus freight to him from that point, although actually he might buy his steel from a mill next door to him, a customer may buy from a distant refinery on the basis of its quoted price, plus transportation to him from the refinery point, although by means of such exchanges he might get his product from a plant in his own vicinity.

The cement case decision is seen by some observers as the inevitable outcome of a series of steps to outlaw identical prices that started some years ago with the original "Pittsburgh plus" case which changed the steel industry from a single-basing-point pricing system to the multiple-basing-point system, since adopted by a number of other industries including the cement industry.

The Federal Trade Commission has been fighting delivered prices for a quarter of a century, and on three separate occasions unsuccessfully

asked Congress to enact legislation specifically outlawing them.

In the cement case, the commission started the proceeding on the grounds that the Cement Institute and its members had conspired to fix prices, and proved its charges, but in the argument before the Supreme Court commission attorneys injected the theory that all forms of delivered price were objectionable.

Had the court contented itself with a finding that the cement companies had fixed prices illegally, no issue would have been raised, but when the court went on to explain its findings in very abstruse language it put on the books a concept of delivered prices which the commission itself probably had not even hoped it would secure. The court, in fact, went so far that even the FTC was taken by surprise, and members of the commission have since been unable to agree among themselves just what the decision does entail with respect to industry pricing systems generally.

Senate Group Investigating

With entire industries crying for light on the decision which the commission itself appeared unable to supply, a subcommittee of the Senate interstate commerce committee under Sen. Homer E. Capehart of Indiana undertook to investigate the matter to determine whether legislation was needed to clarify the situation. It found this split in the ranks of the commission; it also found that Secretary of Commerce Charles Sawyer, a member of the administration, had criticized the decision, predicting that any extensive revision of pricing practices would have severe repercussions upon little business, and it quickly was informed that many businesses which now operate nationally by pricing their products so that they be sold everywhere at the same price (candy bars as an example) would find it impossible to compete in distant markets if they had to adopt f.o.b. factory pricing.

As of today, the effect of the decision, which led the steel and cement industries as a whole and many companies in other industries individually to substitute f.o.b. mill prices for delivered prices, has not been unduly severe for the simple fact that industry currently is operating in an almost unlimited sellers' market, and consumers are able and willing to meet the additional cost of freight. What is cause for concern is what may happen to the whole economy when the present skyscraper demand has been met and industry finds itself in a buyers' market.

Whether Congress will enact legislation straightening out the situation will depend to great extent upon the position taken by President Truman and his advisers. In Congress itself, such legislation is seen as the subject of an intense fight.

Capehart will be succeeded in January as chairman of the subcommittee by either Sen. Edwin G. Johnson of Colorado, who will head the full committee, or Sen. Brien McMahon of Connecticut, both of whom are seen as agreeing with Capehart's view that legislation is necessary (Johnson's Colorado beet sugar producers stand a good chance of being wiped out by f.o.b. mill pricing). But over on the House side Rep. Wright Patman of Texas, who will be chairman of the small business committee will strongly oppose any measure restoring delivered prices.

The one thing certain is that any legislation which may be enecated will not validate any basing-point pricing system which involves phantom freight. Phantom freight has been the foundation of all attacks on basing-point prices, and the Supreme Court has made it definite that it will not be tolerated. Any measure that is introduced in Congress, probably, will say in effect that, barring conspiracy to fix prices or suppress competition, delivered-price systems will not be considered as contrary to the public interest.

Interestingly enough, trade commission attorneys defending their position before the Capehart subcommittee also gave some hints as to how the effects of the cement case decision could be circumvented.

It was suggested, for instance, that if a producer owns a warehouse in a market, no matter how distant, he could ship his product to that warehouse and, by making sales from the warehouse instead of his plant, could absorb the freight to that point. Thus, in the oil industry, if a refining company owned bulk terminals it could sell from those terminals instead of the more remote refinery.

Again, while a manufacturer cannot absorb the freight charges on shipments made by common or for-hire carrier he could deliver with his own trucks without requiring the customer to pay transportation charges—in other words could use a delivered-price system for each transactions.

The issue directly before the Capehart subcommittee is whether Federal Trade Commission pricing policies should be limited to cases of prices developed by conspiracy, but the real issue is the effect of the Supreme Court decision on our national economy. The oil industry is not the only one which may feel the weight of FTC action. A recent compilation discloses that there are an even 50 separate industries which use pricing systems that might be affected by the cement-case decision.

Plan New Orleans Building

The California Co. will occupy about 60 per cent of the floor space of a planned nine-story office building to be erected in New Orleans, La. Owners of the building state that construction will begin in February and completion is expected by 1950.

PIPE LINE CONTRACTORS IN ANNUAL MEETING

Officers and directors of Pipe Line Contractors Association, elected at first annual meeting, Tulsa, November 16-17: J. R. Horrigan, vice president; N. A. Saigh, director; L. H. Morris representing E. G. Morrison, director, in his absence; C. S. Foreman, director; T. A. Hester, Oklahoma Contracting Co., president; J. C. Britton, director; Ray L. Smith, vice president; James P. Neill, H. C. Price Co., treasurer. Others not in the group are Richard A. Gump, executive secretary, and the following directors: Robert Thomas, O. C. Whitaker Co.; F. E. Stanley, Midwestern Contractors, Inc.; and Robert D. Sheehan. In the absence of T. R. Jones, president of this association which is the Mid-Continent Pipe Line Chapter of Associated General Contractors of America, Inc., Hester presided at sessions dealing with subjects including standardization of specifications, depreciation rates on pipe-line construction equipment, and plans for a welding school. James D. Marshall, assistant managing director of Associated General Contractors, Washington, D. C., discussed contractors' management problems

Productive Thinking and Taxation Theme of Rocky Mountain Meeting

DENVER.—"Nowhere else has there been such a stimulus in leasing activity," R. B. Anderson, president of the Texas Mid-Continent Oil and Gas Association, told more than 500 members of the Rocky Mountain Oil and Gas Association at the annual convention in Denver November 18-20.

Anderson's address concerned the "Challenge of Productive Thinking" but reviewed briefly the accomplishments of the oil industry in the Rocky Mountain region in recent years. He particularly pointed to vast resources of coal, gas, and oil-bearing shales in this region that "wait only the capital, the enterprise and the demand to create new horizons of petroleum development."

In discussing basic domestic problems of the American people he said: "If we are to justify our right to determine our own destiny, we must do so by contributing a substantial part of our energy, our talent, and our abilities for thinking to the solutions of the problems of these people who have demonstrated an incapacity for solving problems of their own." He pointed out that "the ultimate soundness of our republic lies in the collective soundness of our people's thinking," and that "the thinking people of this nation must furnish the leadership that will permit the existence of a peaceful world where it does not become recurringly necessary for this or any other nation to rebuild the economy of countries that are overrun and destroyed by the ravages of battle."

According to Anderson the solution of our national problems is for "American business men to raise above the necessities of our own businesses and contribute the thought and energy and effort that is necessary to discharge the responsibility as being the most privileged people on earth."

Nielson Elected President

Glenn S. Nielson, president of Husky Refining Co. of Cody, Wyo., was elected president of the association for the coming year, and R. B. Curran, regional manager for W. H. Barber Co.; Charles S. Hill, Denver independent; and J. F. Cullen, regional manager for Stanolind Oil & Gas Co.; were made vice presidents of the association. Gilbert Mueller, executive vice president of Argo Oil Co., was elected treasurer of the association. Frank C. Fogarty, executive secretary of the association, was reelected. H. A. Stewart, consulting geologist of Denver, past president of the association, presided over the convention meetings.

Taxation of the industry was a primary feature of the convention due to present emphasis on oil taxation by Rocky Mountain state legislatures. Percy F. Jowett, tax specialist of Cheyenne, Wyo., and executive director of the Wyoming Taxpayer's Association, delivered a paper on "Taxation Trends in Wyoming." In this he pointed to an increase of $27,000,000 in the 1948 taxable valuation of oil production in the state, as compared with the valuation last year. He said that the oil industry in the state is the principal corporate tax source and that a cooperative effort is necessary for factual studies, that there be a reasonable return for tax contributions and that taxes be fairly and equitably borne by all.

Severance Tax Is Discussed

Robert S. Palmer, executive director of the Colorado Mining Association, delivered an address prepared jointly by himself and Paul Hunt, vice president of Park Utah Consolidated Mines Co., on the "Severance Tax." Both are outstanding authorities on taxation in the area, and the talk was pertinent for members of the oil industry in the region. He stated that "severance taxes violate every well-established principle of sound taxation" and used numerous examples to prove this point.

"Severance taxes are in general a complete departure from the principle of equality of taxation, but are justified by a curious method of making a few false assumptions and then reasoning to a conclusion," Palmer said. He cited a situation in the Rocky Mountains that was applicable to oil as well as mined minerals in saying that because of the low prices which existed for 10 years prior to the last war, there was very little exploration or development done in a number of our natural resources. "Then on top of that came the war and the tremendous demand for these things made a bigger shortage with excess profits. We are behind in the exploration and development of natural resources. We can repair the damage if we are given time and proper treatment."

John Woodruff, with the extension department of the University of Texas and coordinator for the American Petroleum Institute and American Association of Oil Well Drilling Contractors, outlined the industry educational program for the Rocky Mountain region. Mud schools are now being conducted in Casper and other central points and attendance at these schools has been good. Management institute courses will be furnished both in Denver and Casper. Interest in these courses has been heavy, with more than 75,000 manuals distributed throughout 25 states.

Committee meetings of the association were held in conjunction with the annual convention and emphasis was placed on proposed taxation legislation and state and federal lease forms. Regional representatives of the federal Bureau of Land Management and U. S. Geological Survey were present and assured the oil group of complete cooperation in matters within their jurisdiction.

Oscar L. Chapman, Under Secretary of the Interior, was unable to be present but a statement from him was read to the association. He emphasized the growth of oil activities in the region since his connection with the public-land operations of the Interior Department in 1933, and said "a review of the results of the prospecting, drilling, and development activities in the Rocky Mountain states of Colorado, Montana, Wyoming, and Utah, substantiates the vision of the 'oldtimers' and justifies continued optimism for the future."

"I am sure you will continue to play an important part in the great effort to make this country self-sufficient in petroleum, capable of meeting both ordinary and emergency needs . . . and . . . you will continue to receive the sympathetic and active support of the Department of the Interior," Chapman said.

Small Oil Companies Grow Fastest, Survey Reveals

NEW YORK.—Of the 30 leading oil companies in the country, those with less net worth made more rapid growth in the period from 1940 through 1947, according to an analysis made by the petroleum department of The Chase National Bank.

Thirteen of the 30 companies with net worth of less than $100,000,000 each increased their net worth on the average by about 63 per cent in the 7-year period. Many smaller companies increased net worth even more, according to Dr. Joseph E. Pogue, vice president of the bank.

Eleven companies of intermediate size with net worth ranging from $100,000,000 to $500,000,000 grew slightly less than 46 per cent over the same period. The six largest of the 30 companies with net worth of more than a half million dollars each grew only 44 per cent. The smaller companies in the group also had higher percentage earnings, the study showed.

this week

GOVERNMENT—Federal Trade Commission preparing drive against Group 3 pricing of petroleum products. . . . Part of its attack against all basing-point systems following Supreme Court's Cement Institute decision. . . . Might affect oil marketing in many areas. . . . ¶Legislation to divorce marketing and break up integrated oil companies seen as certain topic of debate in next Congress. . . . ¶Antitrust Division has tremendous backlog of industry cases. . . . Suggestion advanced to create special antitrust courts. . . . ¶Steel industry agrees to consider allocations for oil-industry uses. . . .

TRENDS—One week's failure to set a new record has not halted the upward trend in crude production. . . . After 5 consecutive weeks of new all-time highs, output dropped 1 week but picked up week ended November 20 to a new peak of 5,656,635 bbl. per day. . . . Production has set new records in 26 of the 46 weeks so far in 1948. . . . ¶Colorado, Montana, and Wyoming set new highs for the year. . . . Crude output of the Rocky Mountain region this year is 21.4 per cent above last year, while rest of U. S. increased 6.4 per cent. . . . ¶With the heating season on, stocks of the four major products have increased 11,444,000 bbl. during the 5 weeks since California refineries recovered from the strike. . . . During same period last year stocks increased only 1,988,000 bbl. . . . ¶Two major suppliers along Eastern Seaboard drop heavy fuel-oil prices. . . . Home heating oil prices are cut. . . . Gasoline tank-wagon price raised. . . .

INTERNATIONAL—Feature of development in Western Venezuela is the high yield from wells reaching the Lower Cretaceous. . . . Though discovered only 4 years ago, this formation accounts for 40 per cent of the gain in production. . . . ¶Settlement of "Red Line" controversy gives Iraq Petroleum Co. a new and flexible method of disposing of its crude. . . . Particularly benefits the French and clears way for large-scale development. . . . ¶Plans are advanced for considerable increase in Italian refining capacity. . . .

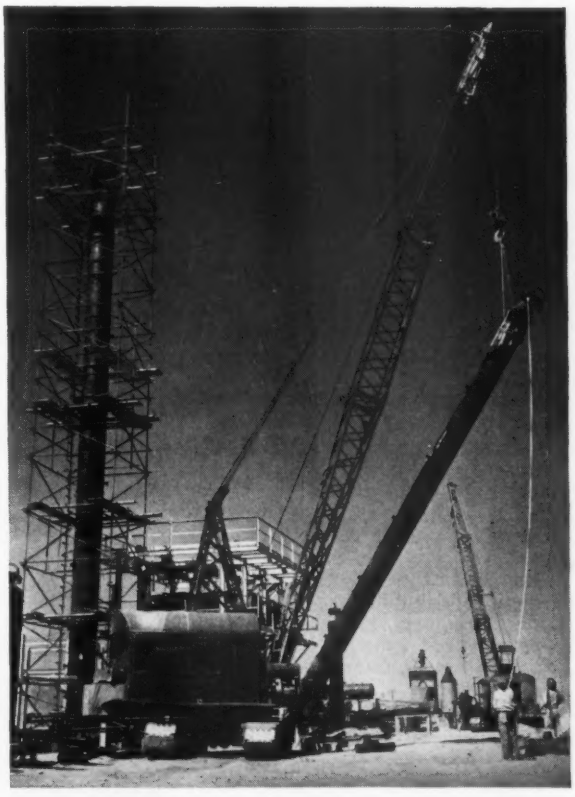
PUBLIC RELATIONS—Unique Oil Appreciation Week of Duncan, Okla., stresses benefits to public and communities brought by oil development. . . . ¶Oil Industry Information Committee gets set for 1949 with new officers. . . . ¶Survey of public opinion shows Oil Progress Day brought wide understanding of oil's achievements. . . .

PIPE LINES—Pacific Gas & Electric takes bids on 34-in., 510-mile pipe line from Topock, Ariz., to Milpitas, Calif. . . . To be largest diameter natural-gas line in U. S. . . . ¶Gulf Coast Northern proposes secondary line to pass through gas fields in Louisiana. . . .

MEETINGS—Rocky Mountain Oil and Gas Association is told that its region is developing faster than any in the country. . . . ¶Dallas geologic and geophysic groups hold seminar on reef formation and new seismic methods. . . . Houston geologists plan discussion of salt domes. . . . ¶Petroleum Electric Power Association schedules convention for next week. . . . ¶Natural Gasoline Association announces program for Amarillo meeting. . . . ¶New Mexico Oil and Gas Association to meet next week. . . .

NATURAL GAS—FPC will further investigate transfer of already committed gas reserves of Panhandle Eastern to wholly owned Hugoton Production Co. . . . Federal Court restrains Panhandle from paying its stockholders a dividend of Hugoton stock. . . . ¶El Paso Natural Gas, San Juan Pipe Line, and Pacific Gas & Electric request authority for total of 1,400 miles of main, gathering and distributing line to serve North and Central California.

REFINING—Sinclair to close Coffeyville, Kans., refinery. . . . Market will be served by products pipe line. . . . ¶McCall-Frontenac's Toronto plant doubles capacity for processing grease and lubricants. . . . ¶Bureau of Mines places German oxygen plant for coal-to-oil demonstration at Louisiana, Mo. . . . ¶Sinclair and Maxim engineers perfect silencer for cracking units. . . .



A 56-ft. deethanizing tower swings into place at the unique natural-gasoline plant Stanolind Oil & Gas Co. is building for the Elk Basin, Wyoming, operating unit. As described on page 135 of this issue, the plant will extract gasoline and sulfur and generate inert gas for injection into the formation

Dallas Geophysicists and Geologists Study Reefs and Seismic Methods

by D. H. Stormont

DALLAS. — What reefs are, how they are formed, where they are apt to be found and what geophysical methods can best be employed to locate them, occupied the attention of some 850 geologists and geophysicists here November 18 and 19. Interspersed with these discussions on limestone reefs and case histories of six fields known to be producing from Pennsylvanian and Mississippian reefs were other papers dealing with recent developments in seismic exploration techniques.

The symposium was jointly sponsored by the Dallas Geological Society and Dallas Geophysical Society. The amount of interest in the meeting's general theme was evidenced by the exceptionally large attendance—only 500 persons were expected—and from the amount of discussion that took place from the floor after the papers were given. Short summaries of all of the papers read at the meeting are presented on page 93 of this issue.

Continental Shelf Described

To open the technical session, Paul Weaver, president of A.A.P.G., Houston, discussed the history of the Continental Shelf of the Gulf of Mexico, describing the shelf's geology and placing emphasis on conditions which lead to the formation of reefs. Ronald K. DeFord, geology professor at the University of Texas, then discussed "What Is a Reef?" Later in the day E. Russell Lloyd, consulting geologist of Midland, Tex., presented "The Barrier Reef Theory" to complete the fundamental data on limestone reefs and their formation.

"Limestone Developments in the Pennsylvanian of the Eastern Permian Basin," coauthored by Frank B. Conselman, consulting geologist of Abilene, and J. N. Conley, of Seaboard Oil Co., Abilene, offered a background for an analysis of the local factors contributing to reef formation. Conselman, in presenting the paper, showed maps of the areas of maximum limestone development with reference to the occurrence of reef-type reservoir rocks. To complete the symposium on reefs, geological data are given on the Jameson, Todd, Lawson-Chapman, Dundee, Vealmoor, and Kleiner Mississippian fields. (Authors of each of these papers are given with the abstracts on page 96.

A discussion of the various geophysical methods in relation to their possible value in locating limestone reefs was given by F. J. Agnich, district supervisor for Geophysical Service, Inc., Dallas. The gravity meter and the seismograph in his opinion offered the greatest potentialities, with the former being of limited value until geophysicists know the type of gravity anomaly to expect over a reef in any given locality.

Reflection Is Most Successful

Greatest success in locating reefs in recent years has come about by use of the reflection seismograph, Agnich stated. It usually is not possible to obtain reflections of usable quality from the reef surface, he pointed out, so that the problem will have to be worked in an indirect manner—the data obtained from surveys will have to be interpreted from the viewpoint of the effects caused by reefs.

The relationships between shallow and deep seismic data had been investigated by the speaker, and he believed that time isopach maps of such datum would be extremely valuable. In this regard he stated:

"Reefs have a considerably greater velocity than the off-reef sediments and deep reflections exhibit false closure due to this velocity contrast. A time isopach map between a shallow and deep reflection will thus show an amount of thinning much greater than would be expected in this area. The results of the survey can then be interpreted as definitely indicating reefing. . . .

"In those cases where no appreciable velocity contrast exists between reef and off-reef materials and where shallow folding due to compaction is present, an isopach between a horizon above the reef and one below the reef will show a thick section. The presence of such a thick section below a shallow fold will be strongly indicative of reefing. In any event isopach maps should be constructed between a horizon above the possible reef section and a horizon below that section. . . ."

In his conclusions, Agnich stated that in an effective exploration program for limestone reef production great cooperation would be required between the geologists and geophysicists engaged in the work. Prior to the commencement of geophysical surveys a thorough study of the paleogeography of the region would have to be made in order to localize, and thus cover thoroughly, the areas of greatest potentialities. He believed that the success of any geophysical program directed toward reef location will depend more upon the quality of interpretation given the data obtained, than upon any other single factor.

Shot Holes Eliminated

Paper arousing most discussion was that of Dr. Thomas C. Poulter, associate director of Stanford Research Institute, on "Elimination of Seismic Shot Holes." In his address Poulter first described seismic work performed in the Antartic on the Byrd expedition which led to the practice of exploding charges in the air rather than in shot holes drilled to a point below the earth's weathered zone. He then described research performed to determine the optimum height above ground at which the charge should be detonated, and discussed experiments performed in determining what the shape of the charge should be to deliver the most effective shock wave front.

W. W. Newton, president, Dallas Geophysical Society, and R. A. Stehr, president, Dallas Geological Society, cochairmen of the convention committee

Regarding the former he stated that while maximum efficiency is attained about 40 ft. above ground, only small gains in efficiency are shown above 8 ft.—from 5 to 8 ft. above ground is about right. Insofar as the shape of the charge is concerned, Dr. Poulter stated that for best results the charge should be cylindrical (length 6 to 8 times the diameter), detonated from the top of the charge.

While chief advantage of the method was the elimination of shot holes, Dr. Poulter stated that it also made possible the securing of more clean-cut records. Generally the records were better than those obtained from shot holes, when it was possible to compare the results of the two methods, and in no areas were the records poorer. *(For more detail on this new method, see The Oil and Gas Journal, November 11, page 214).*

In the discussion that took place following the paper, most of it centered around the noise and possible danger resulting from the charge being detonated above ground. Poulter explained that little or no damage was done to crops or vegetation immediately beneath the charges, and that he felt the method could safely be used within ¼ mile of buildings if normal-size charges were used. While the noise was objectionable, he said that many farmers had expressed a preference for the noise rather than the damage caused by shot-hole drilling.

Poulter Questioned

Questioned regarding the distance the geophone spread should be placed from the shot, he stated that in high velocity areas the geophones should be placed from 2,500 to 3,000 ft. distant. Regarding the impact delivered to the earth he stated that pressures as high as 100 psi. had resulted over an area 40 ft. in diameter. Asked about how the method could be employed on steeply sloping hillsides, Poulter replied that compensation for the slope could be obtained by lowering some of the charges 1 ft. or so.

Other papers dealing with geophysical exploration presented at the 2-day session were: "A Precision Detail Gravity Survey of the Jameson Area of Coke County, Texas," by Hart Brown of Brown Geophysical Co., Houston; "A Seismic Problem of Faulting," by M. W. Quarles of United Geophysical Co., Dallas; and "A Seismic Problem Encountered Across Faults," by E. J. Stulken of Geophysical Service, Inc., Dallas. Carl H. Keller of Atlantic Refining Co., Morgan City, La., gave a nontechnical discussion of the basic theory of shoran, and how it is used for marine geophysical exploration.

Two other geological papers presented were: "Distribution of Heterostegina Lime, Fannett Field, Jefferson County, Texas," by Howard Hough of Gulf Oil Co., Houston; and "Microstructure and Behavior of the Sediments," by Eugene McDermott, P. E. Haggerty, and Gale White of G.S.I. and W. R. Ransone and E. C. Reagor of Geochemical Surveys, all of Dallas.

R. A. Stehr and W. W. Newton, presidents of the Dallas Geological Society and the Dallas Geophysical Society, respectively, served as general cochairmen of the convention committees. J. M. Clayton of Seaboard Oil Co. and K. E. Burg of Geophysical Service, Inc., served as joint chairmen of the program committee.

House Committee Shelves South American Oil Study

WASHINGTON. — Plans of the House interstate commerce committee to make an on-the-spot survey of the oil situation in Venezuela and Brazil were laid on the shelf this week, probably permanently, because of a number of factors, among them the current longshoremen's strike and the political disturbances in Venezuela.

During the summer the committee made a trip to Mexico, as a result of which it is understood the United States oil companies in Venezuela proposed that it go to that country so it could compare the results of private enterprise and government operation in the Latin American countries. An invitation reportedly was extended to visit Brazil, which has oil fields on the Venezuelan and Peruvian borders which it would like to develop with financial aid from this country.

Following his return from Mexico, committee chairman Charles A. Wolverton of New Jersey issued a statement that the committee had been impressed with the necessity that the Mexican Government and its oil industry should be given assistance in the shape of additional capital, techniques, and personnel to develop Mexico's oil resources. The statement, however, was the same as had been given out in Mexico before the committee left for Washington, and whether the committee actually will recommend that the United States provide this assistance, and on what terms, will not be made known until the committee issues its report, probably in January.

Electronics Study Series Started by Houston Groups

Joint technical meetings of the American Institute of Electrical Engineers, the Society of Exploration Geophysicists, and the Institute of Radio Engineers have been planned in Houston during the winter months.

The first of the meetings, a discussion of automatic volume control amplifiers for geophysical applications was held Monday, November 22. Topics for later meetings will be selected to meet the needs of the group.

Steel Industry Agrees to Continue Oil Allocations

WASHINGTON. — A politically repentant steel industry last week agreed to provide practically any steel-allocation programs called for by the Government, with the result that the oil industry's proposals for agreements covering line pipe, oil-production equipment, and bulk and terminal tankage will be whipped into shape without further delay.

Convinced by the results of the election that further resistance to voluntary agreements under Public Law 395 would only pave the way for enactment of materials-control legislation, the steel products advisory committee, meeting with officials of the Department of Commerce, readily accepted proposals of the Office of Industry Cooperation to extend for 6 months after expiration of the act next February the present programs covering steel for the construction and repair of tankers and for oil-field tank and production equipment.

Six weeks earlier the committee had been agreeable only to the continuance of programs covering steel for the Government and had refused to reconsider oil-industry programs which it had previously turned down. At that time, however, industry leaders were anticipating the election of Governor Dewey.

The industry committee expressed a willingness to provide steel for the proposed East Tennessee natural-gas pipe line but asked the OIC to make a further study to determine whether the project should cover only military needs or include civilian needs as well.

The steel producers also promised to make a study of the line-pipe and tubular-goods programs urged by the oil industry, and asked the OIC to draft a program for terminal and bulk-tank storage.

Michigan Production Rules Will Be Aired at Hearing

Michigan operators will be given an opportunity to express any suggestions they have as to the state laws governing their business in a meeting set by the state supervisor of wells in Lansing November 30.

Of particular interest to Michigan operators will be a discussion of proposed changes in general rules and regulations governing the spacing, drilling, deepening, and plugging of wells for natural dry gas in Michigan and general rules and regulations govering oil and gas operations in the state.

Both the Michigan Public Service Commission and the Michigan Department of Conservation are cooperating on this public hearing.

International

WORLD-WIDE OIL DEVELOPMENTS

Creole Reports Output Up, Crude Runs Lower

PRODUCTION of Creole Petroleum Corp. in Venezuela in September averaged 653,859 bbl. daily, representing a relatively slight gain of 1,534 bbl. daily over the previous month.

Of the September daily average production, 490,332 bbl. daily came from the Lake Maracaibo region; 4,765 bbl. daily from Cumarebo; and 158,762 bbl. from Eastern Venezuela.

The company's monthly report showed throughput of its two Venezuelan refineries at an average of 82,982 bbl. daily in September. Of this, 63,554 bbl. daily was at Caripito, and 19,438 bbl. daily at La Salina. In August, oil refined averaged 88,402 bbl. daily—68,603 bbl. daily at Caripito, and 19,799 bbl. daily at La Salina.

In September, Creole maintained an average of 32 rigs operating. One wildcat well was completed in the Quiriquire area of Eastern Venezuela with a depth of 5,155 ft. and an initial production of 667 bbl. daily. Fourteen development wells were completed. Area, number of development wells, average initial production, and average depth follow: B.C.F., 7, 667 bbl. daily, 4,113 ft.; Quiriquire, 5, 341 bbl. daily, 5,140 ft.; San Joaquin, 1, 447 bbl. daily, 5,746 ft.; and Temblador, 240 bbl. daily, 4,118 ft.

Other reports are that Creole expects to begin operations in December through its new 144-mile, 24-26-in. pipe line from Rio Ule station in the Lake Maracaibo area to Amuay Bay where the company has a 60,000-bbl. daily refinery under construction. The line will carry some 300,000 bbl. daily which will be moved by tanker from loading facilities to Amuay Bay. Creole will continue to transport heavy crude and specialty types by tanker through Lake Maracaibo. Work on the new Creole refinery is understood to be proceeding slowly.

7-Mile Pier Planned for Saudi Arabian Shipping

A $5,000,000 contract for the construction of a causeway and pier in the Persian Gulf at Dammam, Saudi Arabia, has been given to John Howard & Co., Ltd., a London firm, by Arabian American Oil Co.

The contract marks the first substantial project given a British firm in Saudi Arabia. Arabian American is handling construction of the causeway and pier for the Saudi Arabian Government and will be its principal user on completion.

Work is scheduled to begin on December 1, and completion is expected in about a year. The causeway and pier will carry a standard-gage railway some 7 miles into the Persian Gulf and will be used to berth vessels supplying Arabian American's operations. When completed, the pier will be one of the longest in the world.

Arabian Crude Output and Refinery Runs Increase

Crude-oil production in Saudi Arabia by Arabian American Oil Co. during October rose 6.3 per cent over the previous month to reach a daily average of 468,727 bbl.

The month's total production of 14,530,550 bbl. compared with 13,223,-028 bbl., or 441,101 bbl. daily, in September, and 13,110,349 bbl., or 422,-914 bbl. daily, in August.

Throughput at Aramco's Ras Tanura refinery averaged 134,670 bbl. daily in October, compared to 123,450 bbl. daily in September and 126,624 bbl. daily in August, according to the company's announcement.

Crude production the first 10 months of 1948 amounted to 113,941,-500 bbl., an average of 373,579 bbl. daily. Crude run in the refinery for the same period was 37,687,724 bbl., an average of 123,566 bbl. daily.

Southern Iraq Discovery Well Deepened by Basrah

Although Basrah Petroleum Co., Ltd.'s Zubair wildcat in southern Iraq showed a potential of 3,500 bbl. daily on a ¾-in. choke at 7,775 ft., this well is being drilled deeper, and as of October 27 was down to 8,386 ft. At that time the well was drilling and coring black shale and limestone.

Basrah Petroleum's Nar Umar test, also in southern Iraq, was drilling in limestone at 5,090 ft. on October 27. Bashrah Petroleum is an affiliate of Iraq Petroleum Co., Ltd. These tests are expected to open up a new major oil field in the Middle East.

(For more information on these operations, see The Oil and Gas Journal, October 14, page 62; October 7, page 130; and September 16, page 69).

Alberta Gets Over Million For Four Redwater Leases

A total of $1,037,070.76 was received by the Alberta Provincial Government from the sealed bids accepted on four quarter sections of Crown Reserve lands in the vicinity of the two producing wells in the new Redwater field.

The NE and SE quarters of 36-57-22w4th were bought by the team of Anglo Canadian Oil Co. and Home Oil Co., Ltd., prominent Canadian independents, for $351,025.00 and $302,039.00 respectively.

The NW quarter of the above section brought $283,003.76 from a group made up of Sunray Oil Corp., Pacific Petroleums, Ltd., Princess Petroleums, Ltd., and Max Bell and Associates. This same group paid $101,-003.00 for the NE quarter of 34-57-22w4th.

The two producing wells at Redwater are Imperial Oil, Ltd., 1 Redwater, the discovery, SE 32-57-21w4th, and Imperial 4 Redwater SW 14-58-22w4th. *(See related story on page 149, this issue.)*

British Refinery Project Involves Dock Expansion

Extensive improvements are planned on the Manchester Ship Canal in England to enable its use by the largest-type tankers, according to reports from London.

The project is in general related to the presently planned expansion program for British refineries, several of which are located in the Manchester area. It is indicative of the extensive preparations being made to carry out the program.

Manchester Ship Canal Co. is reported seeking permission for a public loan to make improvements, including a new dock basin at Stanlow where Shell Refining & Marketing Co., Ltd., is expanding its refinery.

I. P. C. Accord Based on Flexible Disposal of Crude Among Members

International
WORLD-WIDE OIL DEVELOPMENTS

by Dahl M. Duff

A FLEXIBLE method for disposal of the crude production among member companies and an arrangement for the purchase of C. S. Gulbenkian's share at a "fair value" in dollars are the principal provisions of the new agreement recently reached by the partners in Iraq Petroleum Co.

The agreement, first made known in company announcements early this month, is of broad significance to the international petroleum industry. It sets the pattern of future Iraq Petroleum Co. operations, removes the Red Line restrictions which have influenced Middle East oil development for the last 20 years, and allows Standard Oil Co. (N. J.) and Socony-Vacuum Oil Co., Inc., to proceed with plans to buy into Arabian American Oil Co.

Some further light was thrown on the agreement last week by publicly released memorandums from Jersey Standard and Socony-Vacuum and by various reliable sources in New York. Many details still remain undisclosed, and comment continued guarded in view of the disturbed political conditions in the Middle East and the attitude of some of the foreign partners.

Under the former arrangement, the I.P.C. partners received a share of the crude oil in proportion to their stock interest. The crude went to the member companies at cost plus about a shilling à ton working-fund charge. With a rapidly expanding refining industry and no other Middle East interests, the French, represented with a 23.75 interest in I.P.C. through Cie. Francaise des Petroles, were particularly anxious for an arrangement on the basis of need.

Members Can Buy Oil As Needed

The new plan provides that the member companies can buy additional oil to meet their stated requirements. Production of the Iraq company is to be stepped up as necessary, subject of course, to the limits of physical producing capacity. This additional oil will be made available to the particular partner at a price determined under a formula which works out to about halfway between cost and market price.

Thus, the French, under the old method, received only about 21,000 bbl. daily when the Iraq company was in normal production of about 90,000 bbl. daily. As a result of the agreement, they can now show need for more oil and have production increased, for example, by 25,000 bbl. daily which would be made available to them.

Gulbenkian, the 5 per cent partner, is represented by Participations & Investments, Ltd., and has no refining or marketing facilities. Since he therefore could not show need for more oil as could the other oil-company partners, Gulbenkian was given an undisclosed amount as his "stated requirement" for the period 1952-66. The other partners are to buy Gulbenkian's oil from his fixed portion, and it is understood the two American companies will provide for his payment in dollars if not possible by another purchasing partner.

I.P.C. Operations Increased

To meet the fears of some partners, namely the French, that Iraq development would be relegated to a secondary status as other partners expanded elsewhere in the Middle East, there is reported to be a corollary agreement providing for stepped-up I.P.C. operations. This presumably includes the additional pipe-line construction previously planned. Stockholders in the company share in the cost of the expansion in proportion to their interest.

The fixed portion of the oil to go to Gulbenkian under the new agreement is understood to be related to completion of the new pipe-line facilities. His increased amount begins at that time, but the oil must be assigned and purchased back from him before the end of 1966.

The new agreement is a permanent one, continuing as long as the I.P.C. company remains in existence. Some details remain to be worked out, but the settlement in London has established the fundamental points.

Jersey Standard and Socony-Vacuum announced their intention of buying a 30 and 10 per cent share, respectively, of Arabian American in December 1946. The French and Gulbenkian objected, contending that such a move was prohibited by the 1928 agreement that any operations in an area circumscribed by a red line—roughly the old Ottoman Empire and including Saudi Arabia—would be for the joint account of all I.P.C. members.

Legal action had been taken in British courts, and the new agreement early this month averted trial of the case at the last minute. The two American companies, which are represented in I.P.C. through their Near East Development Corp., had held that the old Red Line restriction was invalidated by the war.

Pending settlement of the court cases, Jersey Standard and Socony-Vacuum in March 1947 arranged to guarantee bank loans of $76,500,000 and $25,500,000 respectively to Arabian American. The purchase price for the Aramco stock now to be paid by Jersey Standard and Socony-Vacuum will be used to retire the loans.

With the Red Line restriction dissolved, Jersey Standard and Socony-Vacuum will formally acquire the Aramco stock early next month. Ownership of Aramco is at present divided equally between Standard Oil Co. of California and The Texas Co.

The agreement clears the way for continued large-scale development work both in Arabia and Iraq. Only last week, Aramco announced its projected capital expenditures over the next 5 years would total $520,000,000, including $200,000,000 for the Trans-Arabian pipe-line project. The Iraq company is now carrying on exploration in several Middle East countries through its associated development companies.

Production Limited by Lines

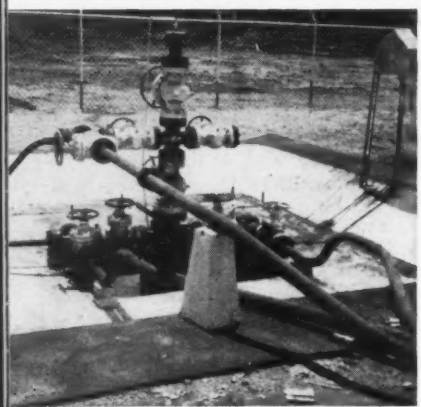
Production of Iraq Petroleum Co. comes from Kirkuk field and is limited to the capacity of the existing lines to the Mediterranean. Twelve-inch lines extend to Haifa and Tripoli and normally carry about 90,000 bbl. daily. At present, however, production is cut back to about 43,000 bbl. daily, all going through the Tripoli line since the Palestine line ending at Haifa is closed due to the Jewish-Arab dispute.

Three other Iraq-Mediterranean lines are planned by I.P.C. A 16-in. line to terminate at Haifa is now about 50 per cent completed. About a fourth of the pipe is on hand for a second 16-in. line to Tripoli but no construction has begun as yet. A third 30-in. line is still in the planning stage.

At Haifa, the two remaining 23.75 per cent I.P.C. partners, Anglo-Iranian Oil Co., Ltd., and Anglo-Saxon Petroleum Co., Ltd. (Shell) operate a 63,000-bbl. daily refinery which has been closed down the last 6 months because of the political situation. A recent dispatch from Tel Aviv, Palestine, quoted the Israeli minister of commerce and trade as saying his government had no intention of taking over the Haifa refinery and that he hoped the plant would soon resume operations under British direction.

High Yield From Cretaceous Formation Boosts Output of Western Venezuela

by D. H. Stormont



Flow from the Cretaceous formation at this well in La Paz field fills three 3-in. lines, making it one of the largest in Venezuela

International

ALTHOUGH only discovered in 1944, Cretaceous oil production in Western Venezuela now amounts to 168,000 bbl. daily, or over 17 per cent of the area's total output. Furthermore, this limestone oil production represents about 40 per cent of the gain in output registered in the area during the past 4 years.

Development of Cretaceous oil pays to date is confined to 27 oil producers in three fields west of Lake Maracaibo. That the majority of these wells are exceptionally large producers is evident from the per-well daily average of 6,200 bbl. Several wells in La Paz field are producing well over 10,000 bbl. daily, and in nearby Mara field at least three wells are capable of efficiently producing at rates higher than the 1,000-cu. m. (6,290 bbl.) arbitrary limit. Lack of shipping and storage space, as well as need for larger pipe-line outlets, also are tending to hold down daily outputs.

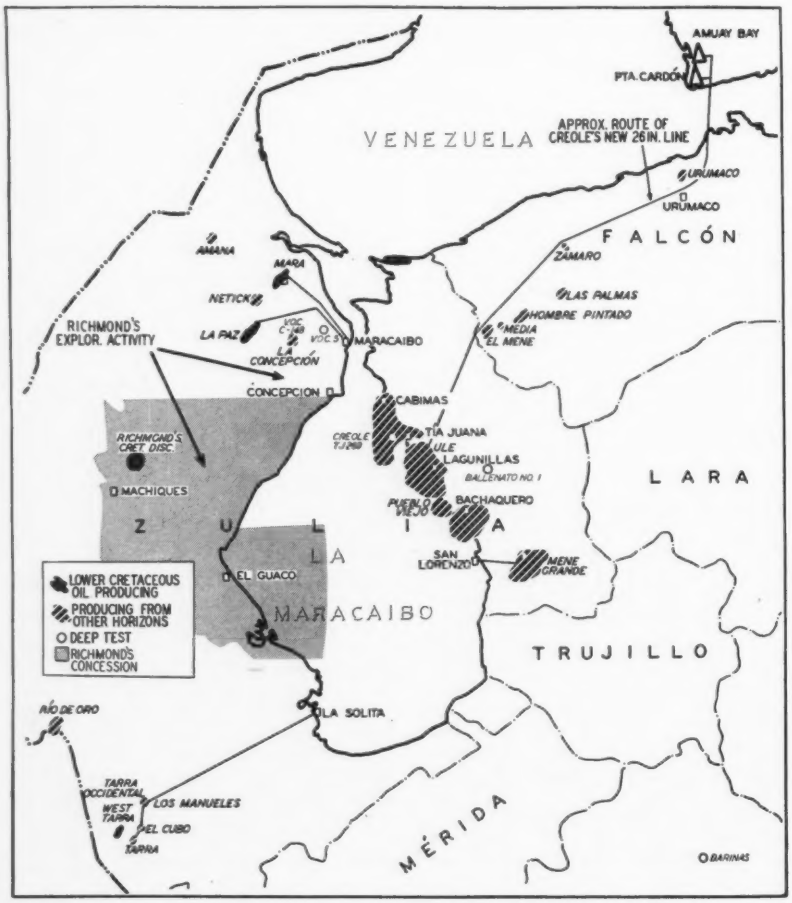
The prolific nature of these limestone discoveries has resulted in a widespread search for other such fields throughout the area west and northwest of Lake Maracaibo and in the lake itself. Of the 13 wildcats under way at this time in Western Venezuela all but 4 are seeking Cretaceous production. Within the proven fields, development is proceeding on a conservative basis—only 15 rigs are in such use and each is required to spend 6 months or more in the completion of one of these 8,000 to 10,000-ft. wells.

Shell Leading Development

Companies of the Shell Group have been responsible for the majority of Cretaceous lime production in the Lake Maracaibo region. In 1944, Venezuelan Oil Concessions, Ltd. (V.O.C.) drilled the discovery well in La Paz field which has proved the most outstanding discovery to date for these deeper pays. The following year another Shell company, Caribbean Petroleum Co., opened Mara field some 20 miles north of La Paz. Last year still another of the Shell Group, Colon Development Co. found Cretaceous oil production at West Tarra, near the Colombian border and 150 miles south of La Paz field.

In addition to these three discoveries, Richmond Exploration Co., a subsidiary of Standard Oil Co. of California, last year reportedly found commercial production in a Cretaceous pay at a wildcat near Machiques, some 50 miles southwest of La Paz field. The discovery, its Zulia 26-1, is believed to have found the pay at about 11,550 ft., and on initial tests produced considerable quantities of 33°-gravity oil. The location of this discovery, as well as the other three Cretaceous fields, is shown on the accompanying map.

Creole Petroleum Corp., Texas Petroleum Co., and Mene Grande Oil Co., have established some Cretaceous production in Mara field, but the great



Map of Western Venezuela shows location of Cretaceous production

bulk of Western Venezuelan limestone oil production is by the Shell companies. In August, V.O.C. produced an average of 130,136 bbl. daily from its 14 oil completions in La Paz field. At Mara, Caribbean's seven producers had an output of 22,353 bbl. daily, the two wells of Creole 9,091 bbl. daily, and the two producers of Texas 5,236 bbl. Mene Grande, in testing its one Mara completion, had a daily average of 19 bbl. The trend in Cretaceous oil output and its relation to the area's total production is shown in the accompanying chart.

At West Tarra, Colon's one completion during August was producing some 1,260 bbl. daily. Richmond's discovery, in the west central portion of its large concession in the district of Perija, was not in commercial production at this time. The company has released only meager information on its operations there so that the exact importance of this discovery is not generally known.

La Paz field, located about 28 miles west of the city of Maracaibo, is entirely on concessions owned by V.O.C. The field is situated on a peneplain which extends from the foothills of the Perija Range to the shore of Lake Maracaibo, and though the terrain is heavily wooded oil operations are not hindered.

La Paz is located on a crest-faulted, southwest-northwest anticline with a steep northwest flank and a less-inclined southeast flank. Crest of the anticline is shattered by a series of longitudinal faults; several cross faults and longitudinal faults also have been found on the southeast flank of the anticline. Tectonic data on the deep Cretaceous formations are still incomplete, but it is quite possible that the anticline is less accentuated in the lower Cretaceous than higher in the section. Production is from the Colon Basal limestone and the Le Luna and Cogollo limestones, with the pay section averaging from 1,500 to 1,800 ft. in thickness.

Depth Averages 8,000 Ft.

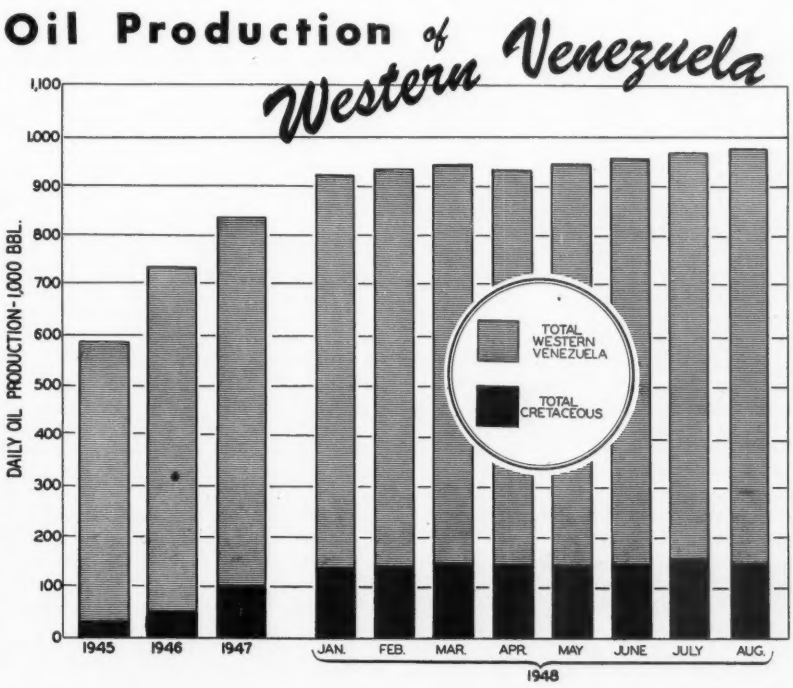
The field's shallow pays, in the Eocene sands and the Guasare formations of Paleocene age, were discovered as a result of a large seepage zone at the crest of the structure where the Eocene formations reach the surface. Production from these shallow sands was started in 1925, but it was not until 1945 that production of the higher-gravity (average 33.5° A.P.I.) Cretaceous oil was started. Average depth of the 14 completions to date has been around 8,000 ft., with the lime being topped at about 4,200 ft. on top of the structure. Future drilling, along the flanks of the structure, is expected to average about 8,000 ft. to the top of the limestone.

Flow lines and two-stage separators at central flow station in La Paz field

Current practices call for a 14¼-in. surface hole being drilled to 500 or 1,000 ft. where 10¾-in. surface casing is cemented. Then usually a 9⅝-in. hole is carried to the top of the limestone where 7-in. casing is cemented. It is planned, however, to return to the early practice of setting 13⅜-in. surface casing and then carrying 9⅝-in. casing to the top of the limestone. From the top of the lime a 5⅞-in. open hole is carried through the section and to the igneous basement unless mud circulation is lost.

Generally, about 4 months of drilling are required to reach the top of the limestone, and then 2 more months are spent in drilling to total depth and completing. Rock bits are used from top to bottom, some 60 bits being required for each well. In drilling the limestone pay the average footage drilled per bit is about 50 ft. Oil-emulsion muds are used below the surface pipe.

All La Paz wells, as well as those



in Mara, have been acidized one or more times. Increases in output as high as 300 per cent have been obtained through acidization, with first treatments generally giving the best results. The initial treatment usually is made with 3,500 gal. of 10 per cent inhibited acid, squeezed into the pay with an oil load.

Most wells are equipped with 2½-in. tubing, set low in the hole. Majority of the wells are producing through two or three flow lines, some of which are as large as 6 in. Because of the large volumes of oil flowed, rather than because of any high pressures, well-head equipment is quite heavy. Gas-oil ratios are relatively low, averaging about 600 cu. ft. per barrel.

In Mara field 12 miles to the north, Caribbean, Creole, Texas, and Mene Grande follow much the same drilling and completion program as outlined above. Development, however, is proceeding at a much greater pace than in La Paz, there being 10 rigs at work as compared with four in the former. Caribbean has four rigs at work and the three other operators each have two.

Production Restricted

All of these companies except Mene Grande have formed an operating agreement, with Caribbean acting as the operator, to facilitate the field's development and operation. Production of any one well is arbitrarily held to 1,000 cu. m. and well spacing is limited to 1,200 m. (about 3,900 ft.) In addition it was agreed that the ratio of completions would be in proportion to proven acreage, with the proportion to be checked and altered from time to time. Thus two of Caribbean's rigs are sometimes contracted to either Creole or Texas.

Mara oil production is obtained from a steeply folded, highly faulted anticline, which was located by means of surface geology, structure drilling, and seismic surveys. The limestone is topped at about 5,500 ft. on the average, with 1,500 to 2,000 ft. of pay being encountered. Mara crude is of asphaltic base and has an average gravity of about 29.2° A.P.I.

Cretaceous oil from both Mara and La Paz fields is handled by Shell's lake terminal at Palmarejo. At La Paz two central flow stations are used in handling the field's output of some 130,000 bbl. daily. Two-stage separation is used (330 and 50 psi.) after which the oil is pumped temporarily to storage. From there part is pumped through 10 and 12-in. line via Cuatro Bocas and part through 11¾-in., 10-in., and 12-in. lines via La Concepcion. Both routes end at Palmarejo, some 24 miles distant, where over 650,000-bbl. of storage have been erected to hold the oil until it is shipped by lake tanker to Shell's large Curacao refinery.

Pending completion of a joint flow station by Creole and Texas, Caribbean is handling the entire 40,000-bbl. output of Mara field through one central flow station. Some 210,000 bbl. of storage are provided at this station, from where the oil is pumped through a 15-mile, 12-in. line to Palmarejo.

Since the discovery well was completed at West Tarra, Colon has had only one rig in operation until recently. The second Cretaceous test in the area, WT-4, is being drilled 1 mile to the north of the discovery (WT-2) and in the middle of October was down to 8,350 ft. (WT-2 was completed at a total depth of 9,000 ft. with the Cretaceous lime being topped at 6,700 ft.) Colon also is drilling WT-5, having reached a depth of 5,470 ft. at that time. In addition the company is drilling a wildcat near the mouth of the Catatumbo River, southwest of Lake Maracaibo. At last reports this test was sidetracking a fish at 3,946 ft.

As previously stated, Richmond has released only scant information on the results of exploration at its 885,-800-acre concession in the district of Perija and extending into Lake Maracaibo. In addition to the Cretaceous discovery made by its Zulia 26-1, the company at last reports was conducting extensive tests in a 11,400-ft. pay at its Zulia 36-1.

Currently the company is concentrating its efforts in the development of the shallower (6,500-ft.) Boscan field, discovered some 25 miles from the lake shore. Richmond has completed seven heavy-oil producers there to date and has eight rigs at work on its development. Richmond plans to have this heavy crude oil available at tidewater on Lake Maracaibo by the first of next year through the building of a 25-mile, 18-in. pipe line from the field to a lake terminal. During August, according to Venezuelan Government reports, Boscan field produced an average of 778 bbl. daily.

Australian 1947-48 Gasoline Imports Are 26,000 Bbl. Daily

Australia imported 26,000 bbl. daily of gasoline in its 1947-48 fiscal year, of which only 3,400 bbl. daily were obtained from the United States, according to Sen. B. Courtico, Australia's Commonwealth Minister for Trade. The bulk of the imports came from Iran and Bahrein Island, he said.

No attempt is being made to divert Australian imports of petroleum products from dollar to sterling sources, the minister explained. However, all petroleum imports today are a dollar expenditure to Australia, irrespective of the sources of supply, he added, because increased imports of sterling petroleum products into Australia would mean that other sterling countries would have to obtain a large proportion of their requirements from dollar sources.

Caltex-Fiat Group Plans Italy's Largest Refinery

PLANS for the largest refinery in Italy, with 50,000 bbl. daily crude-charging capacity, are being pushed by Caltex-Fiat group which controls Petrolea S.A. The plant, to be located in the Po Valley in the village of Trecate (Novara) on the Ticino River, to produce high-grade motor and aviation fuel, is scheduled for completion in 1950.

The refinery will be connected with the Petrolea port station of Vado Ligure (Savona) by a 93-mile 8-in. pipe line with a delivery capacity of 10,800 bbl. daily. Refined products will be distributed by barge on inland waterways which are to be enlarged with ERP funds.

Plans for the refinery include 15 storage tanks to insure operating crude for a month. Also storage capacity at the Vado Ligure station will be enlarged through the construction of 450,000-bbl. tanks.

Other important developments in Italy include the authorization of the Italian Government to increase the capacity of Socony-Vacuum Oil Co.'s Naples refinery from 8,220 bbl. daily to 11,300 bbl. daily by the addition of a cracking unit; plans for another refinery in the Po Valley with a crude capacity of 20,550 bbl. daily to be built by Dr. Kind, formerly managing director of the Aquila refinery at Trieste; replacement of hydrogenation plants at Bari and Leghorn, by catalytic cracking plants; and planned construction of other pipe lines connecting refineries in the Po Valley with seaports on either coast.

Iranian Government and A. I. O. C. Suspend Talks

The Iranian Government's preliminary negotiations with Anglo-Iranian Oil Co., Ltd., over the latter's oil concessions, have been concluded, according to a Reuters dispatch from Teheran.

Anglo-Iranian's representatives, headed by N. A. Gass, a company director, reportedly have returned to London to discuss matters. After a period, not to exceed 3 months, the company is to inform the Iranian Government of its position with a view to following up the preliminary discussions, Reuters states.

Aside from the matter of royalties, which currently approximate 22 cents per barrel, it is believed that the Iranian Government has expressed the view that more Iranian nationals should be employed by the company.

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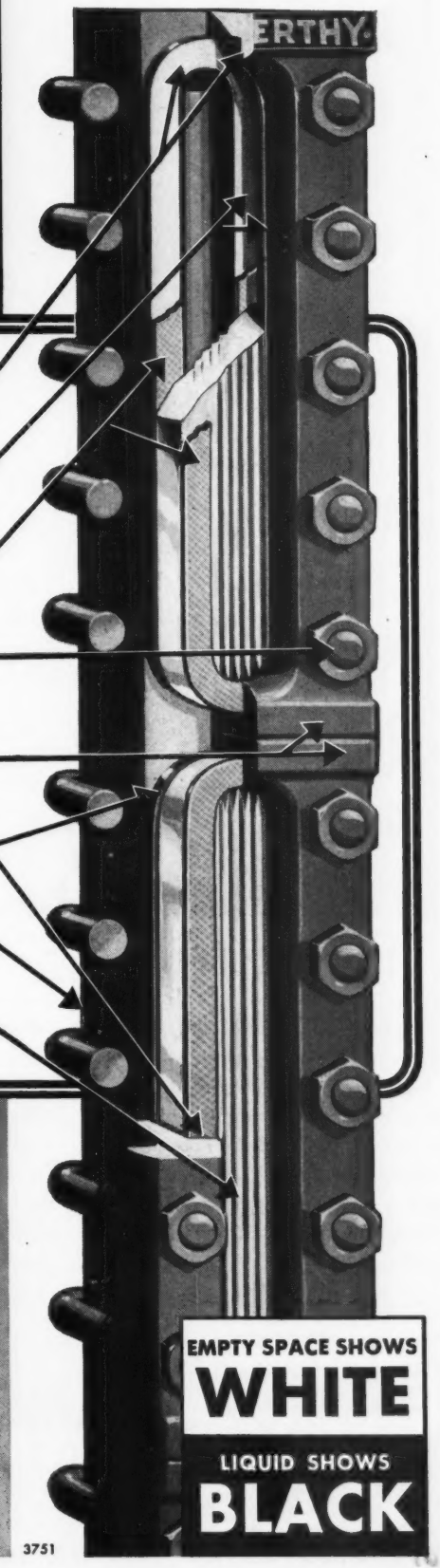

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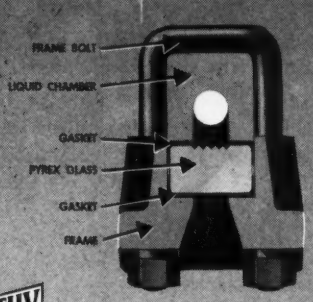

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National Societies Organize the American Geological Institute

FINAL arrangements for the organization of an American Geological Institute, have been completed by 11 national societies representing the geological sciences, for the purpose of directing the talents of the geologic profession into more effective channels of national service, under the sponsoring of the National Research Council. The 11 societies composing the new institute have a combined membership of more than 10,000 professional geologists.

A. I. LEVORSEN

W. B. HEROY

Directors of the institute, named by the affiliated societies, held their first meeting in Washington, D. C., November 15-16, to initiate action aimed at speeding up discovery of additional reserves of scarce minerals, detailed geologic mapping of the United States, greater recognition and use of geologists and geologic sciences in government agencies and the armed services, training of more geologists in colleges and universities to overcome the present critical shortage of geological manpower within the mineral industries, improvement of educational standards in geologic sciences, more effective dissemination of geologic research information, and greater public understanding of geology in modern civilization.

Officers elected by the institute are: Dr. A. I. Levorsen, dean of the school of mineral sciences, Standford University, president; William B. Heroy, consulting geologist and geophysicist, Dallas, vice president; and Dr. Earl Ingerson, U. S. Geological Survey, secretary-treasurer.

National societies that joined to form the institute and support its future activities include: Geological Society of America, American Association of Petroleum Geologists, American Institute of Mining and Metallurgical Engineers, American Geophysical Union, Mineralogical Society of America, Society of Economic Geologists, Society of Exploration Geophysicists, Society of Economic Paleontologists and Mineralogists, Seismological Society of America, Paleontological Society, and Society of Vertebrate Paleontology.

Headquarters of the institute will be established at the National Academy of Sciences, Washington, as soon as an executive secretary has been selected.

Reynolds Will Head Oil Information Committee

CONGER REYNOLDS, director of public relations, Standard Oil Co. (Ind.), has been elected chairman of the national Oil Industry Information Committee, succeeding Ralph C. Champlin, Ethyl Corp.

Four vice chairmen also were elected for 1949. They are Richard Rollins, Atlantic Refining Co.; George H. Freyermuth, Standard Oil Co. (N.J.); G. Stewart Brown, Standard Oil Co. (Calif.); and John Clark, Lion Oil Co.

Reynolds has been a member of the Oil Industry Information Committee since its formation 2 years ago to direct the nation-wide information program of the oil industry.

Most recent of the committee's services was a man-on-the-street poll, made to determine the extent of the impact of Oil Progress Day. The results of the survey, taken 2 weeks after Oil Progress Day, indicate that one out of nine adult individuals, or 11 per cent, of the adult population recalled Oil Progress Day.

Of the 11 per cent who recalled Oil Progress Day, 8 per cent were able to give some description of its purpose, what they remembered about it, or how they happened to notice it.

The committee tabulated the various means used to educate the general public on Oil Progress Day, and the number of people exposed to each. It reported that 2,000 communities participated, 15 governors and 494 mayors proclaimed a special day, 152,000 members of civic clubs heard 2,092 oil men deliver talks, 854 company meetings were held before 57,008 employes, 3,248 broadcasts were made, 82,500,000 newspaper readers could read it in editorial or news columns, 39,500,000 readers could have read about it in company advertisements, and 343 companies held open house for an estimated 325,000 visitors.

Board Combines Groups on Geography and Geophysics

W. E. WRATHER

WASHINGTON.—The Research and Development Board of the National Military Establishment merged its committees on geophysical sciences and on geographical exploration last week into a committee on geophysics and geography and appointed Dr. W. E. Wrather, director of the U. S. Geological Survey, as chairman. The new committee will hold its first meeting this week to map out its program.

Announcing the reorganization, Dr. Karl T. Compton, chairman of the board, explained the new committee will study problems within the scope of the earth sciences, including strategic minerals.

All of the civilian members of the committee are engineers or scientists, drawn chiefly from teaching posts in colleges and universities.

Two Gulf Gas Wells Blow Wild for Brief Periods

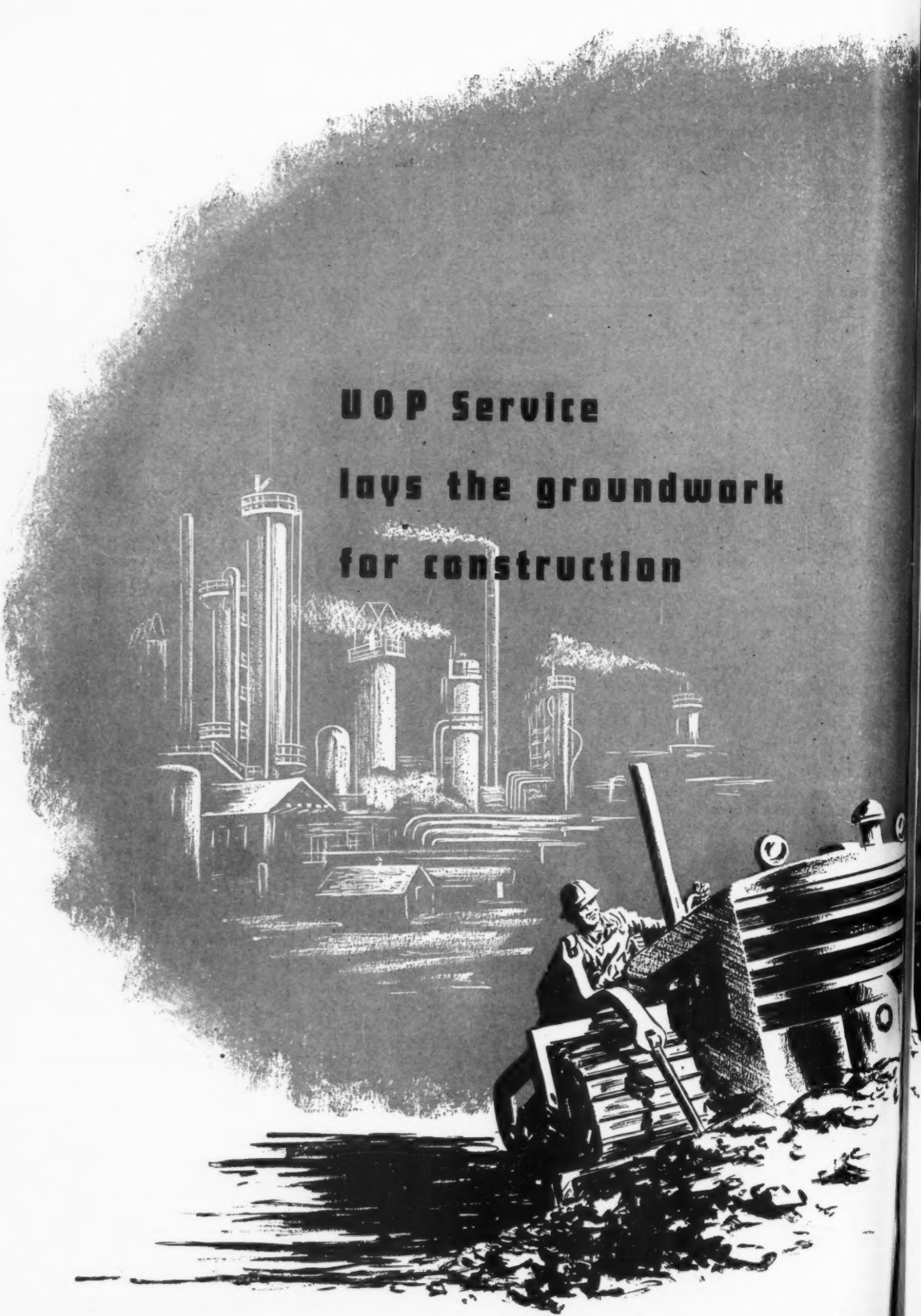
HOUSTON.—Stanolind Oil & Gas Co. has brought its wild gas well in the Gulf of Mexico under control and operations are proceeding to kill it.

Operators were waiting on cement after setting 7-in. casing when the test blew out by cutting through a surface valve. Gas flow is through the annulus and is coming from a sand at 9,000 ft. The well is about 7 miles offshore from West Cameron Parish, Louisiana, and 23 miles southwest of Sabine Pass.

Several hundred miles farther east along the Louisiana coast, The California Co. has had a burning gas well 2 miles offshore in the Gulf at a corehole location. Late reports indicate that the well is almost burned out. California Co. hit a gas pocket at 170 ft. while drilling a test hole prior to driving piling at a new location. Location is 9 miles west of Caminada Pass at west end of Grand Isle.

New Mexico Group to Meet

The New Mexico Oil and Gas Association will hold its annual meeting at the La Miradora Hotel in Hobbs, N. M., Wednesday, December 1. Business session will start at 1:30 p.m. and will continue throughout the afternoon. Officers of the association are Niven Baird, president; Emery Carper, vice president; Harry Leonard, treasurer, and John Kelly, F. J. Danglade, R. L. Hendrickson, J. N. Dunlavey, and Van S. Welch, members of the executive committee.


UOP Service
lays the groundwork
for construction

Universal licensee refiners have learned the value of UOP service even before the bulldozers move in to level the site. Together with Universal research and engineering and the application of Universal refining processes, it provides the basis for refinery design and operating techniques.

Pilot plant tests of crude stocks, for example, help determine the process best suited to the crude and to the market. Instruction of refinery personnel results in a thorough understanding of operating procedure. Tests and inspections of equipment contribute to safe, efficient performance from the start.

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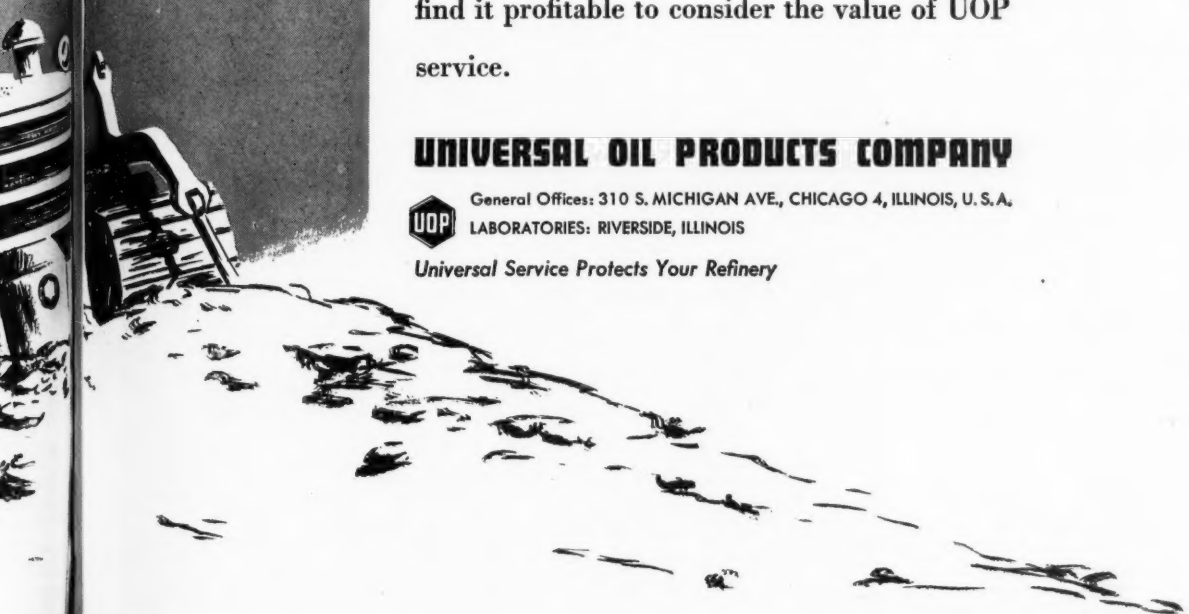
Universal Service Protects Your Refinery



Community Applauds Industry at Duncan's Oil Appreciation Week

THE tremendous contribution of the oil industry to the national economy and state and local welfare is best understood in the Southwest.

This statement by R. M. Chan, vice president of Magnolia Petroleum Co., aptly described the spirit with which the city of Duncan and Stephens County, Oklahoma, staged a unique Oil Appreciation Week, November 15-18.

Chan spoke at a banquet for more than 800 people which climaxed 4 days of festival and education during which virtually all the 17,000 residents of Duncan joined in demonstrating how oil is the foundation of the region's economic life.

With a daily production of 72,000 bbl., Stephens County now leads the state in crude output, and Duncan celebrated.

Main Street was lined with oil equipment, a portable rig staged a drilling demonstration in a downtown location, a replica of the 1917 discovery well, O-Nah-Dy No. 1, was erected on the courthouse lawn, store windows were filled with oil equipment and displays prepared by school children, theaters showed oil-industry films, 2,000 high school students wrote essays on the importance of oil in the community, oil men spoke on the local radio and at schools and civic meetings, and open house was held at refineries and oil fields in the vicinity.

Oil Men Were Grateful

The banquet finale was attended by oil executives from many parts of Oklahoma and Texas, who expressed surprise and gratification at the magnitude and warmth of Duncan's exhibition of appreciation.

"A celebration such as this," Chan told the banqueters, "is of very great significance, since it is held in recognition of the part played by our industry in the growth, progress, and improvement in the well-being of the community and its citizens. This recognition of the tremendous impact of the oil industry on the economy of this area is especially gratifying to members of the oil fraternity, since, while we have been aware of the contribution our business has been making to the general welfare, we have felt that it has been obscured by the attention given to the spectacular and extravagant accounts of the industry which have been fed to the general public since the first well in 1859 created its world-wide sensation.

"I express gratification that the citizens of this county have conducted Oil Appreciation Week, for it bespeaks a knowledge of petroleum impact on the general welfare that we devoutly wish were shared by communities everywhere. For oil, from the day it was first found, has been a contribution to progress in international relations, the national economy, state and local welfare, and has brought an enlarged area of well-being to all who have felt its impacts."

Congress May Consider Oil Divorcement Bills

WASHINGTON. — Legislation providing for the divorcement of marketing from other branches of the industry, and possibly going so far as to break the industry down into four segments, appears to be certain of discussion in the next Congress.

At the same time, the Department of Justice, which has been playing with the idea off and on for some years, may seek court action to the same end, if no legislation is enacted, on the basis of the precedent set in the motion-picture industry where, after a decade of litigation, it recently succeeded in forcing the divorce of exhibition from production and distribution.

The separation of marketing from other activities in the oil industry was proposed last week during hearings before the House small business committee, and a number of members are known to look on the idea with favor. Earlier, Senator-elect Guy M. Gillette of Iowa announced that he intends to sponsor a bill prohibiting a company from engaging in more than one branch of the industry.

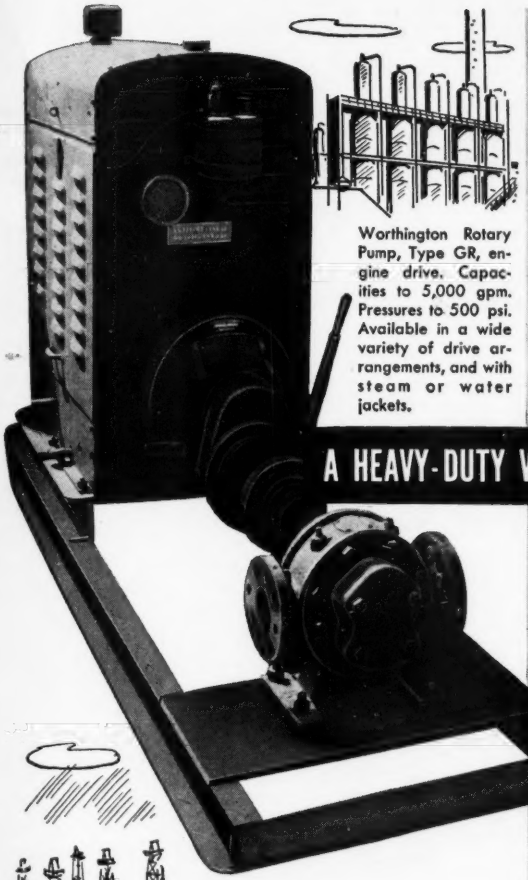
With the set-up in the oil industry roughly paralleling that in motion pictures, with integrated and non-integrated companies, majors and independents, some clues to what the Justice Department might seek in the way of divorce are to be found in what it is doing with the movies.

The government has not sought to outlaw chains of theaters—equivalent to service station chains—but contends they should not be owned by producers and distributors. However, the distributors are to be permitted to retain a few "show cases," and presumably it might permit oil companies to maintain a few service stations for institutional advertising. At the same time, the department has not hesitated to prosecute independent theater chains when it felt they were using their buying power to suppress competition.

During his previous service in Congress, Gillette was interested in industrial divorcement, particularly in the effort to divorce the pipe lines. He served in the House from 1933 to 1936, and in the Senate from 1936 to 1945.

Parade of motorized oil equipment during Oil Appreciation Week in Duncan, Okla.

TWO ROTARIES THAT RATE TOPS WITH OIL MEN

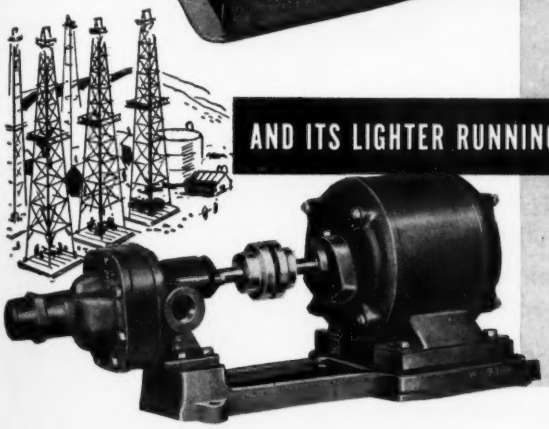


Worthington Rotary Pump, Type GR, engine drive. Capacities to 5,000 gpm. Pressures to 500 psi. Available in a wide variety of drive arrangements, and with steam or water jackets.

A HEAVY-DUTY VETERAN...

IT takes a lot of unbeatable performance records to establish a worldwide reputation such as the Worthington Rotary Pump, Type GR, has enjoyed for many years. That's why today, in oil fields and refineries all over the globe, you find GR's the first choice for the broadest range of non-corrosive, non-abrasive liquid handling. Features like improved double-helical gears, inboard bearings and mechanical seals for overhung drives make an impressive design story. Read all about them in Bulletin W-487-10B.

AND ITS LIGHTER RUNNING-MATE...



JUST as thoroughly "proved in action," this newer and lighter Worthington Rotary Pump, Type GA, is an equally dependable performer in the small capacity, low pressure class. Quiet, efficient herringbone gears and four large, pressure lubricated bearings feature the simple, rugged design that assures years of low-cost, trouble-free service. Get the details in Bulletin W-484-B-1.

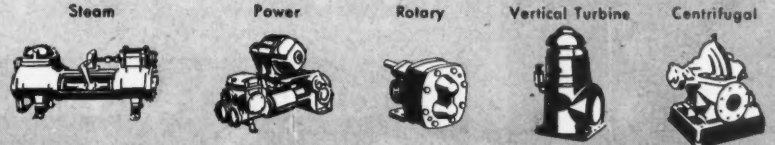
Worthington Rotary Pump, Type GA, motor drive. Capacities to 51 gpm. Pressures to 100 psi. Foot or flange mounted, with or without relief valve.

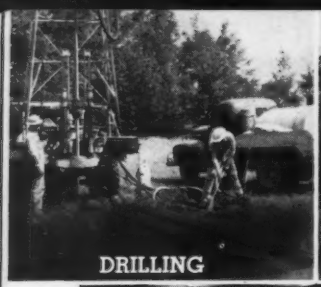
WORTHINGTON

In these two amazingly efficient, economical rotary pumps you see the results of long, careful study of the oil industry's special requirements. Whether your own needs call for the GR, the GA or any other type of pump, remember this fact recognized by oil men everywhere . . . *There's more worth in Worthington! Worthington Pump and Machinery Corporation, Reciprocating Pump Division, Harrison, New Jersey.*

P9-6

THE WORLD'S BROADEST LINE ASSURES YOU THE RIGHT PUMP FOR EVERY JOB

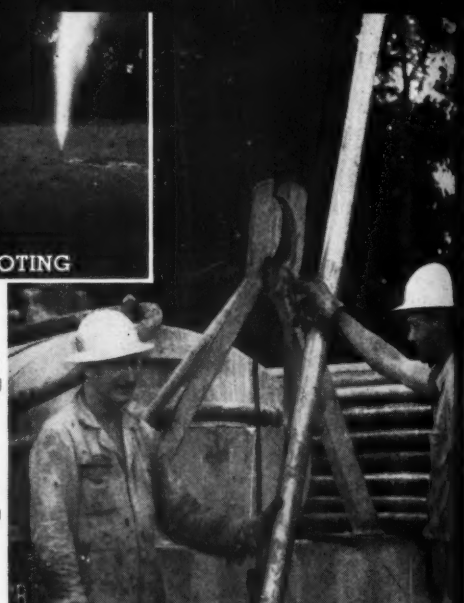


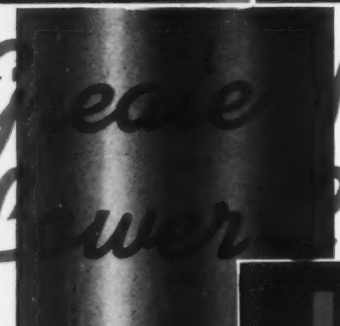

DRILLING

SETTING

SHOOTING

Greater Recovery Lower Cost with J&L STEEL Shot Hole Casing


15,000# average joint pull-out strength of J & L Shot Hole casing gave 100% casing recovery from this hole despite flared end.

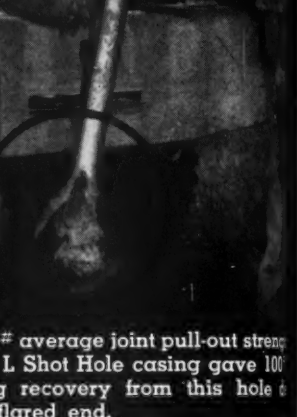


Important money saving features of J & L Integral Joint Shot Hole Casing on seismograph work are:

- **Average joint pull-out strength — 15,000 lbs.**
- **Integral Joint eliminates one threaded connection.**
- **Coarse threads, 4 per inch, cold rolled with full wall thickness and strength maintained.**
- **Smooth interior joint connection prevents wires and explosive charge from hanging up.**
- **Available in convenient lengths; 3" or 4" diameters.**

Contact your nearby Jones & Laughlin Supply store for prices—deliveries.

New Shot Hole Casing Bit



In swampy and sandy areas where "jetting" is necessary this new expendable J&L Shot Hole Casing bit will increase the speed and efficiency of your shooting operations.

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WASHINGTON WATCHING

BY BERTRAM F. LINZ

Antitrust Antics

WASHINGTON. — With a tremendous backlog of antitrust cases piled up, some of them hanging fire for years — including the "Mother Hubbard" suit—Congress next year may be asked to set up a system of separate courts for antitrust litigation.

The many cases filed in recent months by the Department of Justice, possibly with a view to putting the expected new Republican administration on the spot, has instead put the department itself in an uncomfortable position where it is obliged to go through with one of the most extreme antitrust programs ever laid out.

At the same time, the fight in Congress for stronger antitrust legislation will be revived and, if the merger loophole is plugged, still more work is in sight for the courts. That loophole permits a corporation, which is prohibited by law from acquiring the stock of a competing company, to achieve a merger by buying up its physical properties.

Jury-Shopping Out

Several potent arguments may be advanced in favor of special courts for monopoly cases. For one thing, the present delays in bringing suits to trial because of crowded dockets would be eliminated. Judges specializing in antitrust suits would become more familiar with the laws and precedents than can jurists who are engaged in general practice, and there would be fewer of the conflicting decisions which, in the past, have made much work for the Supreme Court.

One thing such a court setup would do. It would prevent the Department of Justice from shopping around for juries that don't like corporations to begin with. That little dodge came to light some years ago when the Government shifted a case from New York, where it was felt a conviction was doubtful at best, to the Middle West, where it expected, and got, a favorable decision.

The Mother Hubbard suit also has been the subject of some engineering. The original case became so big and unwieldly that it assumed the proportions of a mass trial. So the Department of Justice broke it down, announcing that it would bring separate suits against the companies in various jurisdictions. The Government might have lost its big case, but it's bound to hit the jackpot somewhere along the line with little ones.

Deflation Detected

BUSINESSMEN who lit out for the woods when the final election returns began to come in are sticking their heads out cautiously to sniff the wind from Washington, and what they smell is not calculated to reassure them.

Almost universally, they believe the administration next year will embark upon a program to stop inflation short, give the little businessman a break, and "organize" the whole industrial economy of the country.

Such fears will not be allayed by studies now going on in some of the government departments which have developed that there are a number of soft spots which may have in them the seeds of a recession.

One government expert who has been surveying the situation has come up with the following summary: Sales have dropped off substantially in radio receivers, ice cream, deep freezers, men's clothing and shoes at the retail level; digging deeper into the economy are contractions in demand for dyestuffs and certain basic chemicals; air travel has declined and hotel occupancy rates are lower. If business generally were to get panicky and curtail operations, trouble could result.

Most businessmen admit their thinking will have to change as a result of the election. They predict the rising trend of prices will be sharply checked in the hope of avoiding price control; the steel industry will profess great interest in the voluntary allocations program in the hope of avoiding materials controls. And so on down the line.

There is, however, one bright spot in the picture. The predictions of dire things to come may be no more accurate than were the "experts'" forecasts on Dewey's election, and President Truman's message on the state of the union when Congress meets in January may not call for rule by regulation, as many fear.

Scare to Scatter

CONVINCED that it is only a matter of time until a potential enemy country carries its atomic-bomb development to a point where it believes it can successfully attack the United States, National Security Resources Board officials are contemplating the adoption of scare techniques to shock industry into a realization of the necessity of dispersing its plants.

The board, which already has published a pamphlet on the strategic relocation of industry, plans to put out more works of the same type and hopes soon to have a motion picture portraying more graphically the facts as it sees them. That picture will show the fallacy of the "it can't happen here" philosphy.

The ideal would be to have all vitally important industrial plants located in cities of less than 50,000 population. Since atomic bombs are and probably will continue to be tremendously expensive, and would have to be ferried long distances from enemy bases, with the chance of interception, such an industrial setup would tend to make them less desirable as a weapon, it is believed.

The Government, of course, has no power to order industry to move existing plants to any locality it may label safe, or even to direct the location of new facilities. And board officials emphasize they won't even make any suggestions for dispersion until the economic factors add up to the right answer.

All they are now asking is that industrialists consider security as well as supply, markets, labor, and other factors when planning new plants and, where possible, locate them in the smaller cities. Since 1940 there has been a definite trend toward industrialization of the smaller communities, actuated by purely economic reasons, and since that year the percentage of plants in cities of 100,000 or less has increased from 55 to 66. That, says the board, is the first step in the right direction.

Policy Conflicts

IF the National Petroleum Council in January approves the draft of a national oil policy written in Chicago earlier this month by an NPC committee headed by A. Jacobsen, president of Amerada Petroleum Corp., it will smear up the carefully prepared plans of a number of government agencies.

Although the policy as reported from Chicago appears to be little more than a summary of what oil men have been saying right along to Congress and government officials, there are few of its principal provisions that will not bring frowns of displeasure in one agency or another.

The committee, for instance, in recommending that imports be limited

to volumes needed to supplement domestic supplies, differs from the view in military circles that we should use as much foreign oil as possible and save our own for an emergency.

Similarly, in its opposition to locked-up underground reserves, the committee took issue again with the military, as well as with the Wallace Pratt report to the National Security Resources Board recommending a cutback in domestic production to provide an emergency cushion.

The proposal for development of the tidelands under state supervision, of course, runs counter to the administration's claim of federal domination, and the plank opposing any regulation of gathering and processing or end-use of natural gas by the Federal Power Commission won't make any friends in FPC offices.

Opposition to government participation in the development of a synthetic liquid fuels industry isn't exactly in line with Interior Department thinking that the Government should lead the way.

The industry's position is seen as likely to receive a more favorable reception in Congress than in the departments. At the Capitol, all of these things have been discussed and threshed out time after time, and on the whole from a much more conservative viewpoint than that taken by government officials who have urged radical programs which time has shown to be unnecessary.

Probably the only policy plank on which government officials agree with the industry is that stating that a vigorous domestic oil industry is the best assurance we have of meeting an emergency. And that is the foundation on which any national oil policy must be based.

Regional A.A.P.G. Group Study Gulf Salt Dome

HOUSTON. — "Stratigraphy, Sedimentation, and Tectonics of the Salt Dome Region of the Gulf Coast" will be the theme of the regional meeting of the American Association of Petroleum Geologists to be held in this city December 2-3.

The Houston Geological Society will act as host for the meeting and has arranged the technical program to be presented. Executive committee of the group are A. F. Childers, Jr., president; Hershal C. Ferguson, vice president; R. R. Rieke, secretary; and Mary L. Holland, treasurer.

Committee chairmen for the meeting are George S. Buchanan, general; Hillard W. Carey, technical; Carlton D. Speed, Jr., hotels and housing; E. O. Buck, finance; Donald I. Gahagan, entertainment; Mrs. Donald I. Gahagan, ladies entertainment; J. Brian Eby, publicity; Frank I. Gardner, registration; Paul B. Leavenworth, program; and Arthurs S. Gale, Jr., program technician and equipment.

Papers to be presented on the first day of the meeting include: "Modern Views as to Salt Dome Mechanics," Paul Weaver; "Types of Gulf Coast Salt Domes," Oscar Wilhelm; "Recent Sediments of the Mississippi Deltaic Mass," Harold N. Fisk; "Stratigraphy of the Frio Formation in Orange and Jefferson Counties, Texas," Milton F. Reedy, Jr.; "Sedimentary Facies of the Upper Cenozoic and Recent in the Gulf Coast Geosyncline," Sheperd Lowman; "Problems of Deep Drilling in the Gulf Coast Area," Olin G. Bell and coauthor.

On Friday, papers to be given include: "Salt Dome Configurations," Marcus A. Hanna; "Tertiary History of the Gulf Coast Geosyncline," Martin M. Sheets; "Possible Effects of Salt Intrusions on Sedimentation at Boling Dome," William M. Cogen; "Photogeology in Gulf Coast Exploration," Charles DeBlieux; "Exploration in the Gulf of Mexico With the Air-Borne Magnetometer," Robert H. Ray; "Oil in the Gulf of Mexico," D. A. McGee and A. T. F. Seale; and "Recent Developments in Geophysical Equipment," C. H. Carlisle.

Electric Equipment Will Be Discussed by P.E.P.A.

Symposia on producing, refining and pipe-line pumping with electric power are the chief features of the program of the twentieth anniversary meeting of the Petroleum Electric Power Association in Oklahoma City, December 1-3.

The opening session Thursday morning will be devoted largely to association business and reports, and an address by G. A. Davis, president of Oklahoma Gas & Electric Co. A luncheon meeting will be addressed by Dr. Irving Perrine of Oklahoma City, and the annual report of the association president, A. R. Watson, vice president of Southwestern Public Service Co., Amarillo, will be given at the banquet that evening.

At the symposium on production Thursday afternoon the principal paper will be "Electric Equipment for Production," by J. H. Poore of General Electric, Dallas. The pipe-line meeting Friday morning will hear discussions on equipment by M. A. Hyde of Westinghouse Electric Corp., Pittsburgh, and F. G. Giger, Allis-Chalmers Co., Norwood, Ohio. C. L. McNeese of Houston Lighting & Power Co. will lead the discusssion of electric equipment for refining at the Friday afternoon session.

N.G.A.A. Meeting to Stress Operations and Maintenance

The Panhandle - Plains regional meeting of the Natural Gasoline Association of America scheduled at the Herring Hotel, Amarillo, Tex., for December 10, will feature discussions on plant operation and maintenance problems. Addresses and papers to be presented at the one-day meeting are:

"Dehydration of Natural Gas," E. G. Hammerschmidt, Amarillo; "Heat Exchanger Maintenance," J. S. Conners and L. J. Webber, Phillips Petroleum Co., Phillips, Tex.; "Meters, All Kinds," C. C. Clover, Westcott & Greis, Inc., Tulsa; "Increasing Gas Pumping Capacity Through Use of Compressor Cylinder Clearance Pockets," W. R. Barrett, Phillips Petroleum Co., Bartlesville; "Safety Practices in Natural Gasoline Plants," C. L. Ritter, Continental Oil Co., Ponca City; "Practical Fractionation," Dr. Frank Fowler, University of Oklahoma, Norman; and "Crude Oil Distillation," an animated sound film by Shell Oil Co., Inc. Co., Inc.

C. R. Williams, president of N.G.A.A.; Col. E. O. Thompson, chairman, Texas Railroad Commission, Austin, and L. R. Hagy, Hagy, Harrington & Marsh, will address the meeting on industry trends.

Conway, Moran Named NSRB Transport, Storage Heads

WASHINGTON. — Capt. Granville Conway, for many years a government administrator of maritime activities has been named director of the National Security Resources Board office of transportation and storage. Adm. E. J. Moran, president of Moran Towing & Transportation Co., will be deputy director.

Next Week

Instrumentation for Fractionating Columns.—A thoroughgoing step-by-step and instrument-by-instrument account of this basic refining and processing plant subject.

Western Michigan Exploration.—Status report on the drilling play in this active area, by the Journal's field editor who has visited state officials at Lansing, discussed situation features with prominent operators. Includes map of all pools, table of current and accumulated production.

Stabilized Sea Drill.—Barnsdall builds unusual new sea-going drilling unit that marks radical departure from present offshore drilling practice. The complete rig is integral with special submersible hull.

Cleaning Heat Exchangers.—Article covering various methods and relative merits; the coauthors are with manufacturing department, Sun Oil Co., Philadelphia.

Combination Well-Servicing Unit and Derrick.—New equipment of this type, designed in California, offers interesting features.

Adjustable Stabbing Board.—Equipment designed by Penrod Drilling Co., Shreveport, provides safety and speed in running casing of varying joint lengths; incorporates push-button "up and down" electric elevator.

Pressure-Maintenance Plant in Eastern Venezuela.—Two Journal editors give engineering report of the new, very complete 4,800-hp., 1,800-psi. pressure-maintenance plant just installed by Mene Grande Oil Co.

PERSONALS

Spaght Is New President Of Shell Development Co.

NEWLY named president of Shell Development Co. to succeed A. E. Lacomblé, who has been named chairman of the board effective January 1, 1949, is Dr. M. E. Spaght, now vice president of Shell Development, the research affiliate of Shell Union Oil Corp.

Dr. Spaght, who received his A.B., A.M., and Ph.D. in chemistry from Stanford University and studied at the University of Leipzig, came directly to Shell upon completion of his studies in 1933. He began as a research chemist at the Martinez, Calif., refinery and went to the Wilmington refinery in 1935 as a technical assistant. In 1940 he became manager of Shell Oil Co., Inc.'s research and development at the San Francisco manufacturing department office where he supervised planning and processing of Pacific Coast refining expansion for wartime production.

Early in 1945 Spaght went to Europe as a member of the U. S. Naval Technical Mission and later the same year to Japan as a director of the U. S. Strategic Bombing Survey.

After returning to the United States in December 1945 he was made manager of manufacturing west of the Rocky Mountains and held that position until he was appointed vice president of Shell Development Co. in May 1946. As vice president of the company in New York Spaght maintained close touch on technical developments with Government agencies, the Army and Navy, and scientific institutions east of the Rockies.

A. E. Lacomblé, president of Shell Development Co., becomes chairman of the board and will take up his duties in New York effective January 1, 1949. He began his career in the field of petroleum research and development when he joined Shell in 1920 after receiving his doctorate in science from the University of Leyden in Holland. After serving 5 years in the Dutch East Indies Lacomblé became assistant superintendent of Shell's Martinez, Calif., refinery in 1926. Ten years later he was made vice president in charge of manufacturing for Shell Petroleum Corp. in St. Louis. He succeeded to the presidency of Shell Development in 1943 after serving as chairman of the executive committee.

J. B. Rather, who began his career with Socony-Vacuum Oil Co., Inc., in 1918 as assistant chief chemist, has retired and will move to San Antonio, Tex. From 1932 to 1934 Rather was general manager of Socony's research, development, and technical service laboratories. Since then he has been a member of and technical advisor to the company's manufacturing committee.

Edward R. Grey, who was named assistant superintendent in charge of construction and maintenance work at Mexican Petroleum Corp.'s Savannah, Ga., refinery in 1944, has been appointed superintendent of the refinery. After graduating from Tulane University in 1932 in chemical engineering Grey joined the Texas City refinery of Mexican Petroleum's affiliate, Pan American Refining Corp. In 1941 he was transferred to Mexican Petroleum's Savannah refinery as chief engineer.

C. F. Maginnis, formerly Gulf Coast scout for Midstates Oil Corp., has been named to the company's geological staff in Houston. **L. Robinson** of New York has been named to succeed Maginnis as scout.

James H. Ware, head engineer of the process developing department of the Carbide & Carbon Chemicals Corp. plant at Texas City, Tex., since 1945, has been promoted to assistant to the superintendent of construction and design at the South Charleston, W. Va., plant. Ware joined the company at Whiting, Ind., in 1934 and transferred to Texas City in 1941 as development engineer.

W. A. Maley has been named manager of the exploration department for Humble Oil & Refining Co. with

W. A. MALEY

J. B. CARSEY

which he first became associated in 1925 after receiving his degree in geology at the University of Texas. In 1930 he became district geologist for the Corpus Christi area and division geologist in 1937, with headquarters at Corpus Christi. Named as Humble's chief geologist was **J. Ben Carsey,** formerly assistant chief geologist. Carsey, who joined Humble in 1925, was West Texas division geologist from 1932 to 1941, when he was transferred to Louisiana as division geologist. **Ed J. Hamner,** assistant chief geologist for Humble and associated with the company since 1932, has been appointed California exploration manager with headquarters in Los Angeles. **Douglas E. Bell,** division geologist for Louisiana in New Orleans, and whose work for Humble has been principally on the Gulf Coast, has been promoted to head production geologist.

Hartzel C. Slider, of Paden City, W. Va., has been awarded the Shell Fellowship for 1948-49 at Ohio State University where he is taking graduate work in the division of petroleum engineering.

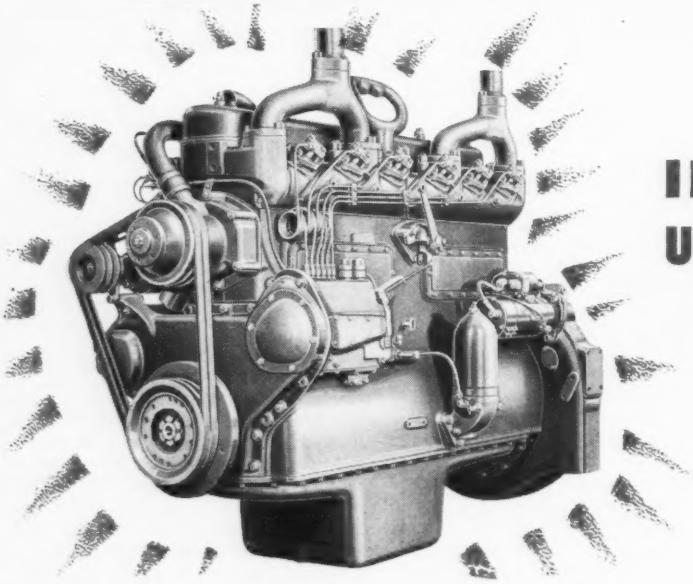
Lloyd E. Elkins, assistant chief production engineer for Stanolind Oil & Gas Co., Tulsa, has been elected a director ex officio as chairman of the petroleum division of the American Institute of Mining and Metallurgical Engineers. **Lewis Emanuel Young,** consulting mining engineer and vice president of Pittsburgh Coal Co., was named president of the A.I.M.E. for 1949.

James F. Blackwell, division superintendent of drilling and production in the Rocky Mountain division for The Texas Co., has been promoted to assistant division manager, Rocky Mountain division, producing department of the company. Blackwell joined Standard Oil Co. of Venezuela as petroleum engineer in 1933 after his graduation from the Uni-

Productive DIESEL POWER—

The INTERNATIONAL UD-24 Diesel Engine

191 Horsepower at 1375 R.P.M.



Here's power that's packaged to do dozens of your oil field jobs with new Diesel economy. This International UD-24 Diesel is built to drive generators, mud pumps, draw works—anything that demands durable, Diesel power. And man, this engine has it!

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versity of Oklahoma in petroleum engineering. In 1936 he joined The Texas Co. as a junior petroleum engineer at Seminole, Okla.

David F. Cocks, who has served as secretary and treasurer since 1943, has been named vice president and treasurer of Standard Oil Co. (Ken-

D. F. COCKS

W. F. ROTH

tucky) and will continue to serve as a director. **W. F. Roth,** formerly sistant to the president and a director, has been named vice president and a director. Other changes in executive personnel of Kentucky Standard include: **Merrill H. Utley,** who has been division manager for Mississippi, becomes a director of the company, and is succeeded as division manager in Mississippi by **E. J. Reynolds. A. B. Bland,** of Louisville, has been made secretary of the company and **A. S. Kyle,** assistant secretary; **E. G. Summer** and **S. P. Smith,** assistant treasurers; **W. R. Gaylord,** manager of the lubrication department; and **H. M. Violette,** assistant manager of the lubrication department.

J. P. Evans, Jr., Jackson, Miss., independent operator, has been elected president of the Mississippi-Alabama division of the Mid-Continent Oil and Gas Association to succeed **W. M. Vaughey. James L. Duffy,** of Grove Hill, Ala., was elected vice president of Alabama.

W. H. Peterson has been made manager of the Chicago office of Enjay Co., Inc., chemical marketing affiliate of Esso Standard Oil Co., and will continue as representative for the company's rubber and plastics products in the Midwest area.

S. T. McCardell, division petroleum engineer at New Orleans, La., for The Texas Co. since 1945, has been promoted to division superintendent of drilling and production, Louisiana division, producing department. McCardell joined Texaco 15 years ago as a rotary rig helper and has advanced through various positions in the production department. **J. A. Battle, Jr.,** assistant division petroleum engineer, has been named to succeed McCardell. Battle joined the company in 1928 as a roustabout at Houma, La.

Robert L. Hoss, petroleum engineer for Humble Oil & Refining Co., has been named recipient of the Alfred Noble award, for outstanding engineering merit on his thesis "Calculated Effect of Pressure Maintenance on Oil Recovery," which was given at the recent annual meeting of the American Institute of Mining and Metallurgical Engineers in New York City. Hoss is the second member of the petroleum industry to receive the award, which is a joint honor conferred by the Western Society of Engineers, the American Institute of Civil Engineers, the American Society of Mechanical Engineers, and the A.I.M.E.

Appointment of three liquefied petroleum gas sales representatives for Warren Petroleum Corp. to newly created positions in Texas and New Mexico includes: **John O. Thompson,** to Fort Worth to handle North and East Texas and southern Oklahoma; **R. C. Brewer,** to Houston to handle Gulf Coast truck sales; and **E. W. Voice,** to Midland to handle the West Texas and New Mexico territory.

J. M. CRAWFORD

John M. Crawford, chairman of Parkersburg Rig & Reel Co., has been elected president of the Twenty-Five Year Club of the petroleum industry to succeed **Harry D. Collier** of Standard Oil Co. of California. Other officers named include: **Frederick H. Bedford, Jr.,** Standard Oil Co. (N.J.), governor of the Eastern area, succeeding **R. G. A. Van Der Woude,** Shell Union Oil Corp.; and **W. K. Warren,** Warren Petroleum Corp., governor for the South Central area, succeeding **R. W. McDowell,** Mid-Continent Petroleum Corp.

Frank E. McCorkle and **Robert Gregg,** who have each served over a quarter of a century with Standard-Vacuum Oil Co., will retire. McCorkle has been chief accountant at the company's Japan office where he has served since 1919. Gregg for over 27 years has been a member of the Standard-Vacuum marine sales division at Shanghai, China.

John A. Walstrom, sales manager, and **J. H. French,** treasurer for Asiatic Petroleum Corp., have been appointed vice presidents of the company effective November 15. During the war Walstrom was director of the theater division of the Army-Navy Petroleum Board, and prior to the war was in charge of the petroleum section of the Federal Bureau of Supply of the Treasury Department. French joined Asiatic in November 1937 and in June 1945 was made treasurer of the company.

J. D. Anderson, division petroleum engineer of the Casper, Wyo., production division for Ohio Oil Co.,

J. D. ANDERSON

E. W. SHOUPE

Findlay, Ohio, since 1942, has been appointed manager of the purchasing department and will assume his new duties in the company's general office December 1. **E. W. Shoupe,** assistant purchasing agent since 1930 and in the company's purchasing department since 1924, has been promoted to purchasing agent. **M. E. Loose,** present head of the production budgeting department, has been named assistant to the manager of the purchasing department.

H. B. GERNERT

H. B. Gernert, formerly assistant division manager for The Texas Co., Rocky Mountain division, has joined Trigood Oil Co., with headquarters in Casper, Wyo., to become manager in charge of the Rocky Mountain operations of that company. Gernert had served with The Texas Co. for the past 18 years. **R. W. Robbins,** formerly district geologist for The Texas Co. in Wyoming, Idaho, and South Dakota, was named assistant manager in charge of exploration for Trigood Oil Co. and the Fred Goodstein's interests in the Rocky Mountain area.

Dr. John E. Mahan, section chief of the Phillips Petroleum Co. research department, Bartlesville, Okla., has been elected chairman of the Northeast Oklahoma section of the American Chemical Society, to succeed **James R. Owen** of Phillips Petroleum.

Dr. John H. Maxson, geologist and former division manager for the Rocky Mountain division of Bay Petroleum Corp., has been named division manager of the newly established Rocky Mountain division of

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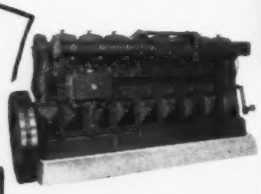
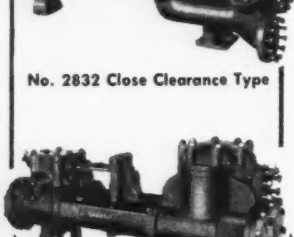


No. 2568 Gas Engines

No. 2921 Oil Field Type

No. 2832 Close Clearance Type



No. 2933 General Service Type

REFINERY PUMPS . . . . Process Centrifugal Pumps; Steam or Gas Engine Driven Hot Oil and Cold Oil Pumps; Tar and Residuum Pumps; Close Clearance Pumps for Volatile Liquids; a pump for every refinery service.

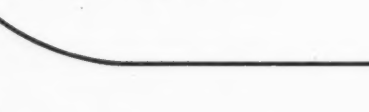
OILFIELD PUMPS . . . . Pipe Line, Gathering Line and Tank Pumps.

GAS ENGINES—STEAM ENGINES . . . . Vertical and Horizontal Gas Engines; Gas Engine Driven Compressors; Steam Engine Driven Compressors.

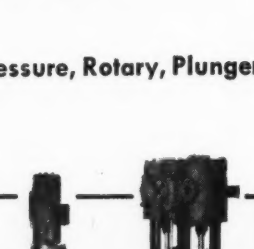
MARINE PUMPS . . . . Cargo, Fuel Oil, Boiler Feed, Bilge and Ballast Pumps. Reciprocating and Rotary.

GENERAL SERVICE . . . . Low pressure, Rotary, Plunger and Power Pumps.

No. 3046 Rotary Pumps



No. 10,040 Centrifugal Pumps



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Standard Supply and Hardware Company, 822-838 Tchoupitoulas St., New Orleans, Louisiana

Reeves & Skinner Machinery Co., 2211 Olive Street, St. Louis, Missouri

Anderson - Prichard Oil Corp. The company will open an office in the Continental Building in Denver, Colo., soon.

F. C. SEALEY

W. H. FARRAND

F. C. Sealey, general manager of the foreign producing department of The Texas Co., has been promoted to assistant to **C. E. Olmsted,** vice president in charge of foreign operations. **W. H. Farrand** succeeds Sealey, and **J. P. McCulloch** takes Farrand's post as assistant general manager. **W. A. Clark,** assistant manager of operations, has been promoted to manager of operations of the foreign producing department. Sealey joined Producers Oil Co., former Texaco subsidiary, in 1917, as an assistant geologist and has been associated with the company's foreign producing activities since 1938. Farrand, associated with Texaco since 1929 both in the United States and abroad, has been assistant manager of the foreign producing department since 1946.

Bernard C. Michaels, land clerk in the Mount Pleasant, Mich., office of Sohio Petroleum Co., has been named head of the land department of the company's operations in the Owensboro, Ky., district office.

A. C. Rall and **C. F. Salzer** have been appointed assistants to the controller for Gulf Oil Corp. **J. F. Tims, Jr.,** who has been assistant manager of the company's general statistical department since 1936, has been named manager of that division.

E. Owen Scott, Jr., who has been active in geological work in the Southwest Texas area, has joined the geological staff of Warren Oil Corp.'s Corpus Christi, Tex., district office.

Maylon S. Baker, Jr., formerly with the Ohio State Geological Survey, has joined the staff of R. V. Hollingsworth's Paleontological Laboratory in Midland, Tex.

Bryant F. Kenney, assistant general superintendent of the Bayway, N. J., refinery of Esso Standard Oil Co., is serving as acting general superintendent of the refinery during the approximately 3 months' absence of **J. Raymond Eiffe** on a rotational assignment. Other temporary changes include: **George F. Eustis,** assistant mechanical superintendent, to acting assistant general superintendent; **Dale I. Watkins,** maintenance and construction superintendent, to acting assistant mechanical superintendent; **Charles H. Degener,** maintenance engineer, to mechanical craft supervisor; and **John B. Hanna,** to maintenance engineer. Recent permanent appointments in the Esso Standard refining organization include: **John F. Niedzialkowski,** to foreman in the carpenter department at Bayway; **Frank A. Lawson,** to foreman in the Bayway electrical department; **George J. Flint,** to foreman in the boiler shop at the Bayonne, N. J., refinery. At the Bayonne refinery, **Albert A. Peer** has assumed the duties of technical assistant to the general foreman of the lube treating section in the paraffin division.

SHIFTS—

L. R. Whitson, engineer, O. W. R. Oil Co., Piedmont, Calif., to Dallas, Tex.; **Richard A. Ganong,** engineer, General Petroleum Corp., Bakersfield to Taft, Calif.; **Fred L. Nabors,** engineer, Stanolind Oil & Gas Co., Brownfield to Lubbock, Tex.; **J. A. Beck,** engineer, Phillips Petroleum Co., Dallas, to Shreveport, La.; **Charles D. Lee,** foreman, Shell Oil Co., Inc., Holliday to Pampa, Tex.

Wm. B. Lumpkin, Jr., foreman, Cities Service Refining Corp., Houston, to Glena Park, Tex.; **W. Rinehart Miller,** geologist, Humble Oil & Refining Co., Kingsville to Encino, Tex.; **Allen D. Acomb,** engineer, The Texas Co., Houma to Erath, La.; **R. J. Casey,** foreman, The Texas Co., Mt. Carmel, Ill., to New Castle, Wyo.; **Allan Borders,** geologist, Ohio Oil Co., Winchester to Lexington, Ky.; **George S. Coyne,** foreman, Sohio Pipe Line Co., Covington, Ohio, to Hagerstown, Ind.

George W. Hoffman, engineer, Continental Oil Co., Golden, Colo., to Glenrock, Wyo.; **W. D. Chawner,** geologist, Carter Oil Co., Olympia, Wash., to Bowling Green, Ky.; **N. C. Hillhouse,** superintendent, Barndall Oil Co., Avant, to Earlsboro, Okla.; **Raymond M. Ingram,** engineer, Carter Oil Co., Seminole to Pauls Valley, Okla.; **J. T. Butterfield,** superintendent, Sun Pipe Line Co., Ingleside, to Corpus Christi, Tex.; **Robert G. Mills,** superintendent, United Geophysical Co., Kenedy, Tex., to Edmonton, Alberta, Canada; **John L. Robinson, Jr.,** geologist, Gulf Research & Development Co., Ozona, Tex., to Lovington, N. M.

H. E. Treichler, engineer, The Texas Co., Daisetta to Bellaire, Tex.; **J. T. Payton,** engineer, The Texas Co., Conroe to El Campo, Tex.; **Tom Gaines,** engineer, The Texas Co., Houston to El Campo, Tex.; **Ralph Knipe,** geologist, Ohio Oil Co., Grand Rapids, Mich., to Marshall, Ill.; **Leroy V. Hester,** engineer, Stanolind Oil & Gas Co., Ulysses, Kans., to Oklahoma City.

William Knesby, engineer, Standard Oil Development Co., Billings, Mont., to Rutherford, N. J.; **William L. Carr,** geologist, Pure Oil Co., Rawlins, Wyo., to Billings, Mont.; **Z. E. Wood,** engineer, Phillips Petroleum Co., Bartlesville, Okla., to Phillips, Tex.; **H. G. Sole,** foreman, Ohio Oil Co., Pauls Valley, Okla., to Eureka, Kans.

Guy W. Staples, foreman, United Geophysical Co., Bakersfield, to Hanford, Calif.; **J. W. Branson,** geologist, Magnolia Petroleum Co., San Antonio to Falfurrias, Tex.; **Lloyd Hanson,** superintendent, Arrow Drilling Co., Tyler, to Odessa, Tex.

DEATHS

O. V. Beck, 58, who began his oil career in the Burkburnett field of Texas and who held oil interests in Texas and Oklahoma, died November 21 in Dallas.

Dr. F. G. Cottrell, 71, former director of the U. S. Bureau of Mines and inventor of electrostatic method for clarifying air and gases and for breaking emulsions of water in petroleum, died November 16 in Berkeley, Calif.

William Ungerman, 60, independent oil producer, died November 16 in Tulsa.

Henry M. White, 62, president of North American Oil Co., died November 15 in Baltimore, Md.

Edward J. Malloy, 65, of the construction division of the Bayway refinery of Esso Standard Oil Co., died November 19 in Elizabeth, N. J.

Harry L. Olinger, 35, superintendent of Stanolind Oil & Gas Co.'s Bishop, Tex., gasoline plant, was killed November 16 in an automobile accident near Bishop.

Edward J. Slater, 82, retired independent producer and rig-building contractor, died November 16 in Tulsa.

Wayne Ponting, independent Montana oil producer, died November 11 in Great Falls, Mont.

In this aerial shot of the Avondale Marine Ways, Inc., yards at New Orleans, three L.S.T.'s undergoing conversion can be seen. In the foreground, a prefabricated offshore drilling platform is being constructed

LARGE-SCALE L.S.T. CONVERSION

PROGRAM UNDER WAY ON GULF COAST

by Leigh S. McCaslin, Jr.

EIGHT wartime "work horses" of the U. S. Navy—designated as Landing Ship Tank (L.S.T.)—are undergoing a face lifting at shipyards in New Orleans and Mobile. Humble Oil & Refining Co., in the most ambitious such program to date, is converting these vessels for offshore drilling in the open waters of the Gulf of Mexico.

During the war, the 327-ft.-long L.S.T.'s transported a large percentage of the men and materials involved in amphibious operations in both Europe and the Pacific. They have been called the backbone of the amphibious forces. Although, as their name implies, they were designed primarily for tanks, all types of vehicles and material were moved in them. In landings on enemy-held beaches, the craft were sailed right onto the beach and a large door in the bow opened to disgorge troops and equipment.

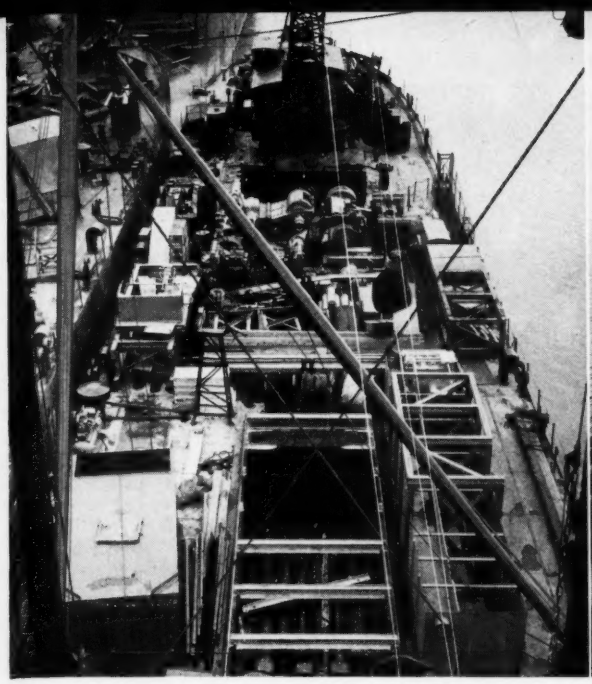
With war's end, the L.S.T.'s were abundant and their peacetime uses in the Navy were negligible. Hence, many of them—each representing a $2,000,000 investment when fully equipped—were declared surplus. Oil companies with leases in the Gulf of Mexico immediately seized the opportunity of getting some ready-made equipment at bargain prices for offshore drilling. As war surplus, the L.S.T.'s have been purchased for around $75,000 each.

19 for Humble

For offshore drilling, the L.S.T.'s are teamed with a piling platform to provide the working space and storage facilities necessary for the drilling of an oil well. Although the purchase price is low, the conversion cost of the L.S.T.'s runs high. One company estimates that each ship represents an investment of between $575,000 and $625,000, not including the initial cost. This heavy investment includes towing to the shipyards for conversion, design work, conversion, and drilling equipment permanently aboard.

Humble has purchased a total of 19 surplus L.S.T.'s from the U. S. Maritime Commission—5 of which were at Lake Charles, La., and 14 in San Francisco Bay. In a major towing operation, the 14 on the West Coast have been brought through the Pana-

At this stage of conversion, workmen have removed gun emplacements and other wartime appurtenances not useful in the craft's new role as a drilling barge. A 35-ton revolving crane will be mounted in the spot where the two workmen in the foreground are standing

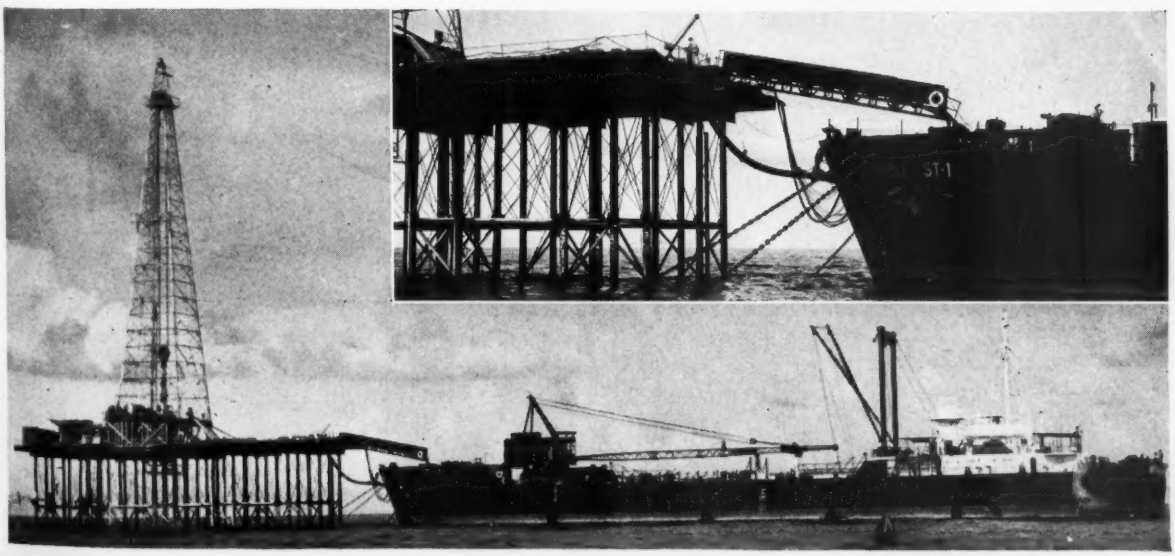


Above, left: After conversion work is completed, the top deck of the L.S.T. is loaded with the equipment necessary for rigging up on the drilling platform. The platform mud tank can be seen in the right foreground. This tank does double duty by serving as a substructure for the draw works. A shale shaker is mounted on the tank and during normal operations the tank serves as a settling pit. In case of a storm which requires the L.S.T. to be moved away from the platform, it is used as a circulating tank

Above, right: The 35-ton revolving crane is being used to transfer drill pipe from the hold of the L.S.T. to the drilling platform

Right: These four 50-ton stern winches are used to anchor the L.S.T. at the offshore drilling location. Each L.S.T. was originally equipped with one of these winches on center line aft to pull off of beaches. The two aft (right side of picture) have been converted to use chains rather than 1⅝-in. cable

Below: The converted L.S.T. has been anchored to the drilling platform and the rig is "making hole." The mooring system is designed to withstand winds of 100 m.p.h. on the bow, 80 m.p.h. on stern or broadside. This particular location is Humble 1 Caminada Pass, a 14,000-ft. test off Jefferson Parish, Louisiana. A unique walkway connects the L.S.T. and the drilling platform. It operates on rollers and a turntable to compensate for roll and pitch. The mud, air, fuel oil, fresh water, salt water, electric, and telephone lines between the two can be seen



Above: This workman is adjusting the controls on the diesel prime movers which run the two 500-hp. mud pumps shown in the picture. The mud pumps are below the top deck of the L.S.T. near the bow. Note the large amount of working space around the pumps. It was necessary to use unusually long V-belts—D-600—in order to provide this ample working space

Left: An overhead crane moves pipe which is stored below decks. The large revolving crane picks it up through the hatch in the upper left of the picture to transfer it to the drilling platform

Below: This closeup shows the equipment installed at the bow of the L.S.T. The large chains are part of the mooring system. The several lines in the immediate foreground are mud, electrical, air, fuel oil, fresh water, salt water, and telephone lines which are strung between the L.S.T. and the platform. Hammer unions have been installed on the lines to enable the connections to be broken quickly in the event a storm makes it necessary to move the L.S.T. away from the platform. In the upper center can be seen an electrical logging unit and the roller-turntable used on the walkway to the drilling platform

ma Canal to temporary berths at Orange, Tex.

Three of the 19 craft have already been outfitted for offshore drilling by Avondale Marine Ways, Inc., of New Orleans. In addition, Avondale is presently converting two more. At Mobile, Gulf Shipbuilding Co. has contract for the conversion of three additional craft. Hence, a total of eight have been converted or are in the process of being converted.

These craft are scheduled for use at eight drilling platforms which Humble has already erected off the Louisiana and Texas coasts. Offshore activities of the company to date have been heavily concentrated in the area off Grand Isle, La. However, one of the L.S.T.'s is scheduled to drill Humble's first well off the Texas coast near Freeport.

Actual conversion of the ships requires many man-hours, much time, and money. Design and specifications for the work are prepared by Humble's marine engineering section of the petroleum engineering division with the assistance of engineers and superintendents in the field. Supervision of the work is done by the marine equipment division of the production department.

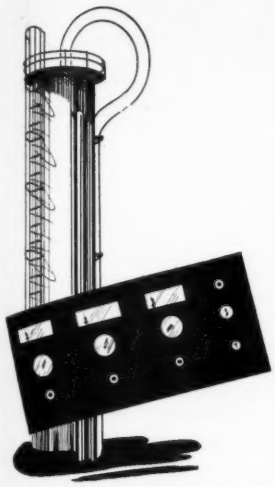
Numerous Changes Topsides

Changes topsides on the ships are numerous. Gun emplacements are cut away, and the bow doors (used for unloading in wartime) are welded tight. The existing hatch near the center of the ship is enlarged to facilitate the movement of drill pipe, casing, cement, and other materials stowed below decks. A 35-ton revolving crane is mounted between the hatch and the bow. The 115-ft. boom of the crane enables it to move materials from the hatch to the deck of the drilling platform. Five-ton cargo booms just aft of the hatch are available to unload barges when the revolving crane is busy with other work.

Six 50-ton winches are placed on the top deck—two forward and four aft. These winches are used to moor the L.S.T. at the offshore drilling location. The entire ship is sandblasted to remove rust and scale, and then rustproofed and painted.

Below decks, four of the ship's ballast tanks are converted into drilling-mud tanks—two for circulating and two for reserve. About 600 bbl. of mud can be contained in the circulating tanks and the same amount in the reserve tanks. Flexible hoses connect the mud tanks to the drilling platform when operations are under way. Two 500-hp. diesel-powered mud pumps are placed below the top deck near the bow. Air controls permit the driller to operate the mud pumps from the drilling platform.

(Continued on page 123)



Automatic Control of FRACTIONATING TOWERS

by V. V. St. L. Tivy*

The increased demand for high-octane gasolines has resulted in the need for more exact separation of hydrocarbons in fractionating columns with a consequent desire for improved automatic control.

The reasoning which should be followed in the application of automatic controllers is outlined and emphasis is laid on the necessity for close integration between plant design and automatic control engineering. A number of typical control systems are discussed culminating in the suggestion of a new method for control of precise fractionators.

This paper was presented at the American Society of Mechanical Engineers' petroleum division meeting, Amarillo, Tex., October 4-7.

THE function of instruments in a refinery may be clearly broken down into two categories. One group covers those instruments which are used for providing an indication of a process condition or a record of that condition for the guidance of operators and for statistical reasons. The selection and application of these instruments should be determined largely by the personnel who will be operating the equipment in order that they will be provided with as much information as is deemed necessary for operation of the units in accordance with their standard practices. The application and selection of these instruments follow well-established lines and further discussion on them at this point would serve no useful purpose.

The second group into which instrumentation may be subdivided is that covering the instruments used for automatic control of the process. Continuing changes in process requirements and in development of automatic control equipment make desirable a review of the engineering involved in application of these controllers.

In order to obtain the most effective use of automatic control the equipment must be applied with a better understanding of the process itself with particular reference to the end product required, the effect upon the process of manipulation of valves and also complete understanding of the limitations and capabilities of automatic controllers. It is very desirable that the physical design of processing equipment be carried on concurrently with the design of the automatic control system particularly as it is often found that the engineering details of one affect the other.

In order to illustrate the various factors which influence the selection of equipment for control of refining units, it is proposed to examine the layout of a fractionating column and to discuss the different methods of control and the reason why certain systems are suggested. There are a number of so-called conventional arrangements of control equipment which are based on experience gained

*The Foxboro Co., Foxboro, Mass.

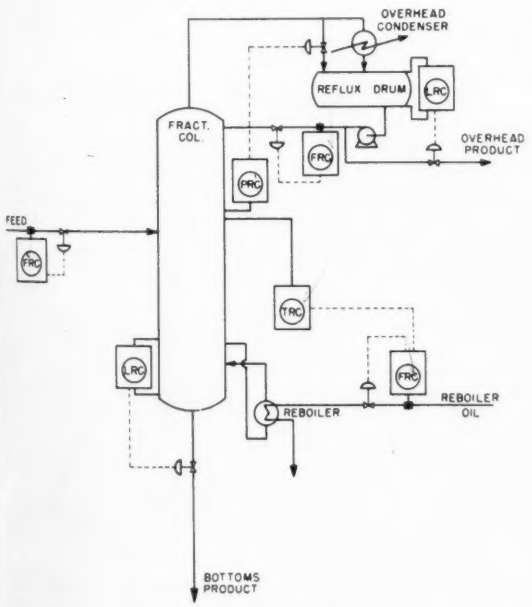


Fig. 1—Instrumentation of a multistage fractionator

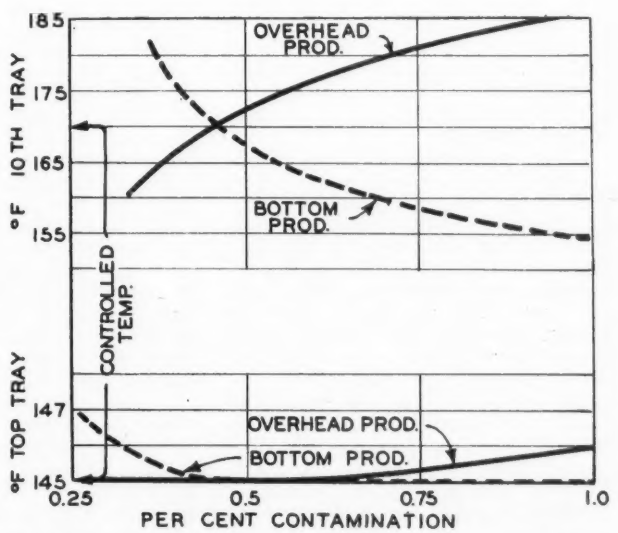


Fig. 2-3—Purity of overhead and bottom products versus temperatures on top and tenth trays

through the years and which in general are adequate. As more and more refiners find it necessary to improve their over-all fractionation and with the advent of improved control equipment it is suggested that other less conventional but more positive control systems be adopted.

The instrumentation of a fractionating column illustrated in Fig. 1 may now be discussed. This tower could be one in a multi-stage fractionation unit and could be designed to separate two hydrocarbon fractions such as butane and pentane. The physical arrangement of the column is along conventional lines where the feed is brought in at one of the intermediate trays, heat input obtained through a reboiler at the base of the column, and overhead cooling through the medium of reflex consisting of the condensed overhead vapors.

In order for the column to operate at its highest efficiency, it is necessary that the feed to it, velocity through it, heat input, reflux ratio, and withdrawal rates all be maintained at steady rates. Abrupt changes in any one of these can cause an upset in the column which temporarily at least will reduce its fractionating efficiency.

Because of the foregoing, feed to the column is provided with an automatic flow controller which will maintain a constant rate of flow regardless of varying pressures either before the valve or in the column. The rate at which the bottom product is withdrawn need not affect efficiency if the column is designed with adequate holding space at the bottom. A simple level controller will be adequate to regulate this product withdrawal. Similarly, the rate of overhead product withdrawal may be handled adequately with a level controller.

The four variables which do materially affect operation are pressure and temperature in the column, rate of flow of reflux, and rate of flow of reboiler heating oil. These four variables should therefore be examined somewhat more closely with particular attention being paid to the design of the column.

Any fractionating column is designed to operate with a certain reflux ratio and when the feed to the column is provided with an automatic flow controller, it becomes logical to furnish the reflux with a recording flow controller. The operator may then maintain a ratio between these two instruments exactly in accordance with the concentration of overhead product in the feed.

The pressure in the column must be controlled exactly and for this purpose a recording pressure controller is furnished connected into the column at some appropriate point. The method in which control may be obtained will vary depending upon the design of the column and overhead piping but generally speaking, pressure control of a fractionating column is simple. Therefore, the control engineer may locate his control valves directly in the overhead vapor line or bypassing the overhead condenser or in the overhead condenser water. The process engineer may select the location being guided by other considerations.

Temperature Control

The flow of reboiler heating oil must be regulated in order to maintain temperature in the column at the desired operating value. A temperature controller operating a valve in the oil line will provide reasonably good control. In a column where close control is required, this degree of control will not be satisfactory. The combination of heat transfer and transportation lag in the temperature system renders the control somewhat difficult, and it is therefore necessary to remove from this particular control system any upsets which may be introduced from outside sources. For example, if the pressure drop across the control valve in the oil line were to change, then the flow will change and eventually the temperature in the column will change. The temperature controller may then correct the position of the valve to compensate for the changed pressure drop but the time taken to do this will result in a period when the column will be operating off specifications. To overcome this, a flow controller is used in the reboiler oil line and its control point is set by the temperature controller. In this manner any conditions which might affect the rate of flow as called for by the temperature controller will be corrected immediately by the flow controller without affecting the temperature in the column.

An examination of the over-all control system reveals that the key to the operation of the column now lies in the temperature controller. The selection of the point of temperature control therefore becomes exceedingly important. If the overhead product is the important one, then it would seem logical to locate the temperature-sensitive element in the overhead line but further examination reveals that this is not necessarily the case. It must always be remembered that in order for a controller to operate, the medium which it is controlling must be permitted to vary some because a controller can only produce a change in valve position consequent upon a measurement change. The only manner in which the overhead vapors can change, where their pressure is controlled, is for the composition of the material to change. Thus, any operation of the temperature controller must be produced by a composition change and since the controller operates with a decided time lag, it means that every operation of the controller will be followed by a period of time when the column is producing off specification material.

Fig. 2 shows the relation between overhead temperature and purity of overhead and bottom products. It will be seen that the purity of both products can vary substantially while the overhead temperature remains at 145°. To control the tower from temperature at this point would not be satisfactory because no matter how well the temperatures were controlled, product would still vary.

A properly designed fractionating column is provided with excess trays at the top and bottom and consequently it is possible for the temperature at a certain point inside the column to change without affecting the quality of the overhead product. It follows therefore that the location of the temperature-sensitive element should be in the column at a sensitive point. An examination of the temperature gradient in the fractionating column will reveal a point some few trays above the feed inlet tray where the maximum temperature variation will be obtained without affecting overhead product and it is at this point that the sensitive element will be located.

In Fig. 3 the temperature at tray No. 10 in the tower is plotted against purity of overhead and bottom products. It is at once apparent that there is a substantial change in temperature in accordance with composition changes and it becomes easy to select a point at which control of temperature will insure top and bottom products being at the desired degree of purity.

For a great number of fractionating columns, a control system as shown in Fig. 1 with temperature control point selected in accordance with the above will be entirely satisfactory. However, where the separation of

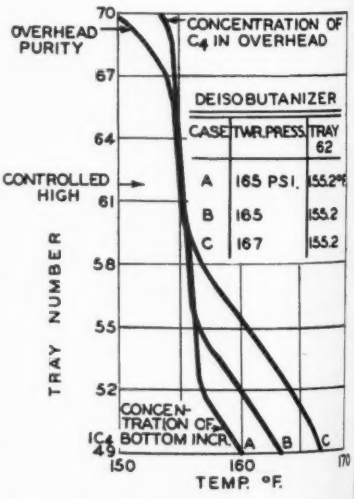


Fig. 4—Plot of temperature gradients with varying pressure. Controller maintaining temperature at sixty-second tray

components with close boiling points, such as iso and normal pentane or butane, is involved further consideration is necessary.

Where the two components being separated have close boiling points, the temperature must be held to very close limits and in addition, pressure becomes an important factor. In Fig. 4 the temperature gradient in the upper section of a deisobutanizer is plotted. A temperature controller is maintaining tray No. 62 at 155½° F. As tower pressure changes, the composition on tray No. 62 must change in order that the temperature will remain at 155½° F. Consequently, composition and temperatures throughout the rest of the tower must change. In case III to satisfy the pressure temperature relation the liquid on tray No. 62 becomes richer in normal butane and therefore a greater number of trays between it and the top are required to complete the separation between the two key components. Since these trays are not there, the overhead vapor is overly rich in normal butane as shown by the temperature curve. Conversely, in case I, the concentration of normal butane on tray No. 62 is reduced and overhead product improved if anything but concentration of isobutane in the bottom is increased.

It may be concluded that unless pressure can be controlled to very precise limits, the control system shown in Fig. 1 is not suitable for towers separating close boiling compounds.

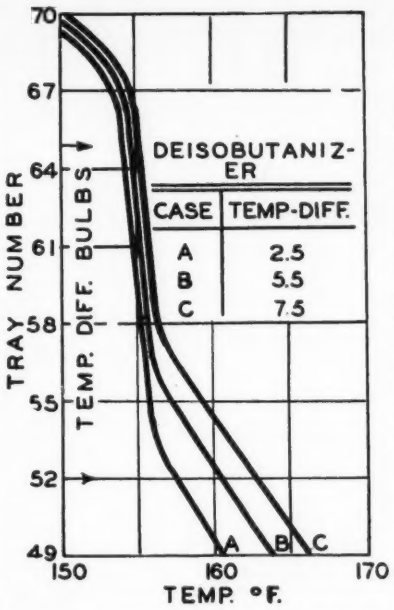


Fig. 6—Plot showing sensitivity of differential temperature control. All tower variables except reboiler steam flow are maintained constant to produce the temperature gradients shown

Temperature Difference Control

A modification of the control system is shown in Fig. 5 where a differential temperature control is used as the "key" column controller. Because the temperature gradient through a fractionating column does not follow along a straight line but rather contains a number of breaks in the curve, it can be shown that two points in the column may be picked where the temperature difference between them is a very exact measure of the conditions in the column.

The sensitivity of a differential temperature control is illustrated in Fig. 6 where substantial changes in temperature difference are observed, yet where overhead temperatures remain practically constant. Thus, if a differential temperature controller with a range of—say 0°-20° were used, variations of 2° or 3° would produce substantial pen motions in the controller so that for the small changes necessary for the controller to operate there would be substantially no change in overhead composition.

The effect of pressure changes is shown in Fig. 7 where the temperature gradient is plotted for a tower in which a temperature difference of 5° is being maintained. It is seen that the temperature on any one tray will alter with changes in pressure so that the correct pressure-temperature relation will be maintained for the liquid on that tray. There is no attempt on the part of the controller to alter any one temperature and it is satisfied as long as a temperature difference of 5° is maintained. This temperature difference is a function of the materials on the trays involved and will not be affected by small changes in tower pressure.

A further point worthy of consideration is that where temperatures are being measured to very close tolerances, errors due to bulb or thermocouple installation caused by improper heat transfer from well to bulb and improper location in the tray, will become substantial. When, however, the temperature-difference system is used in which the temperature readings

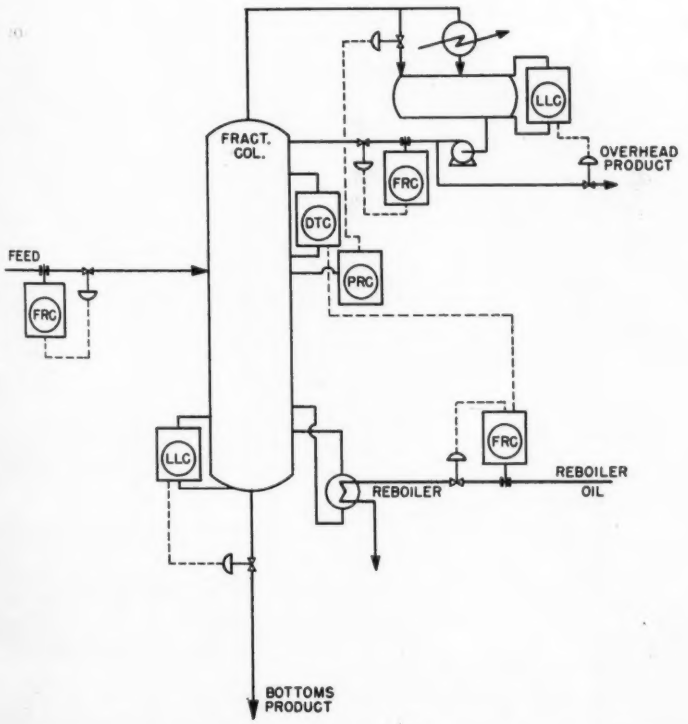


Fig. 5—Control system modified to incorporate differential temperature control

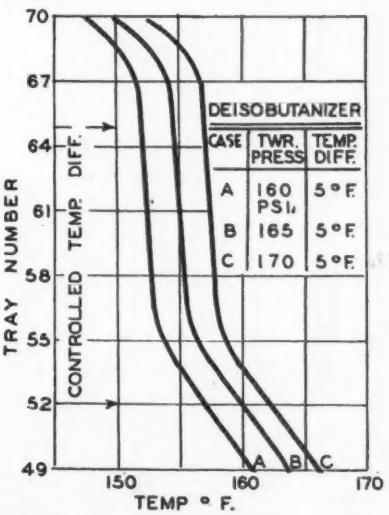


Fig. 7—Controlled temperature difference tray 52-65. Plot of gradients with varying pressure

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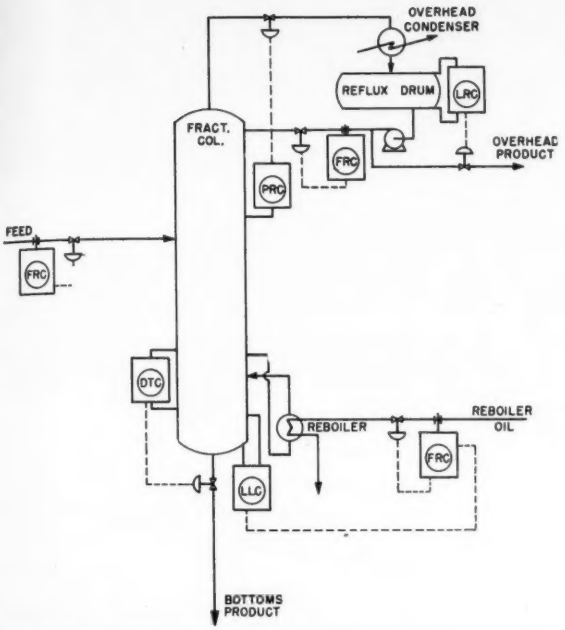


Fig. 8—Liquid-vapor concentrations on controlled trays maintained by temperature difference controller regulating bottoms product removal

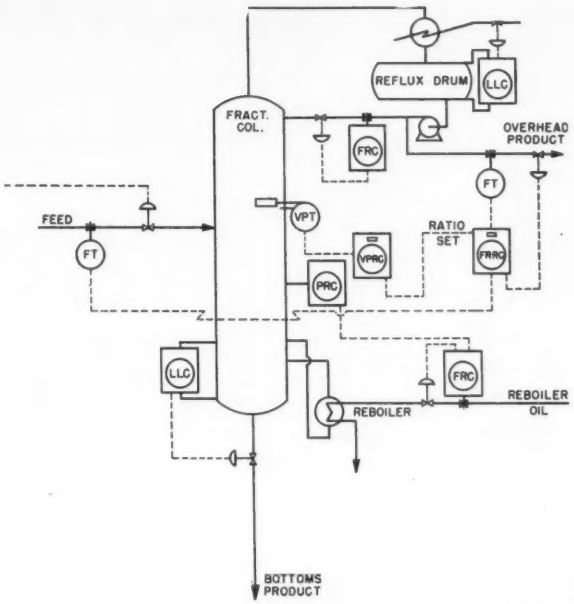


Fig. 9—Arrangement of control instruments when employing a flow ratio controller on feed and overhead product and vapor pressure transmitter

are relative, these errors can be expected to be compensating and accuracy of measurement and hence control will be materially improved.

As shown in Fig. 5, a temperature difference may be maintained in the rectification section of the tower when the purity of overhead product is most important. On the other hand, when purity of bottom product is the more critical of the two, a temperature difference in the stripping section of the tower may be used. Such an arrangement is shown in Fig. 8 where the temperature-difference controller operates the product drawoff to maintain the required liquid-vapor concentrations on the controlled trays. As the level tends to change, a controller adjusts the rate of heat input to maintain the tower in equilibrium. This combination of temperature-level control provides a very stable system.

Further examination of this control system will reveal the fact that as long as the measurement points for the differential temperature controller are selected carefully and as long as feed rate to the column remains constant, the control system has only to correct for variations in composition of the feed as well as ambient variations, cooling-water variations, and temperature variations in the reboiler heating oil. All of these variations may be kept down to the point where they do not become too great and consequently the column will be expected to operate at maximum efficiency.

Unfortunately, there are circumstances where it is not practical to lay out a column in accordance with the foregoing, most particularly in regard to the automatic control of the feed. It frequently occurs that the feed to one column is taken from the bottom of a preceding column and in order to avoid flooding or emptying that column the feed flow must be controlled by the level in its base. A further complication arises that it is not always convenient to determine in advance the precise points for the location of a differential temperature controller because of insufficient data on the exact characteristics of the temperature gradient in the column.

Vapor-Pressure Difference Control

In view of the foregoing, a fourth general control system may be examined in Fig. 9. It will be seen that

(Continued on page 124)

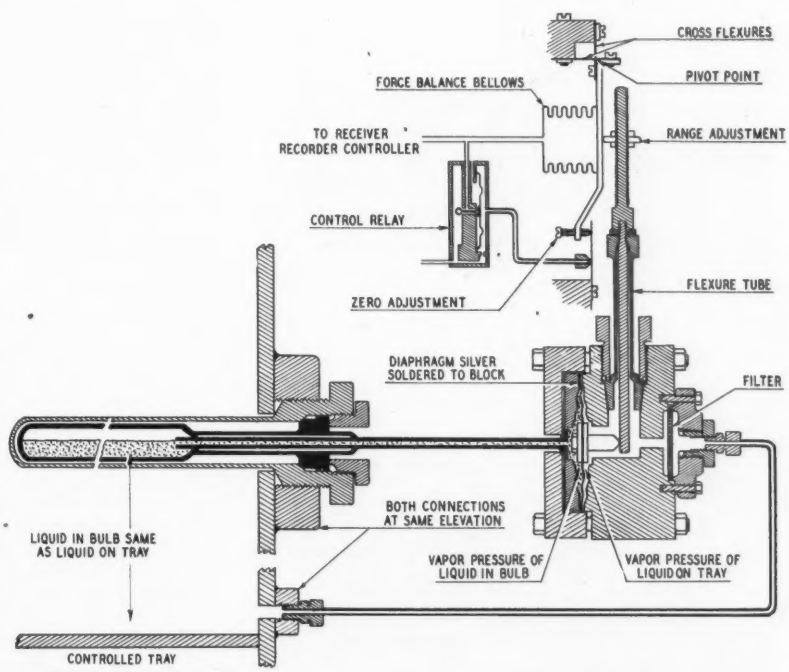
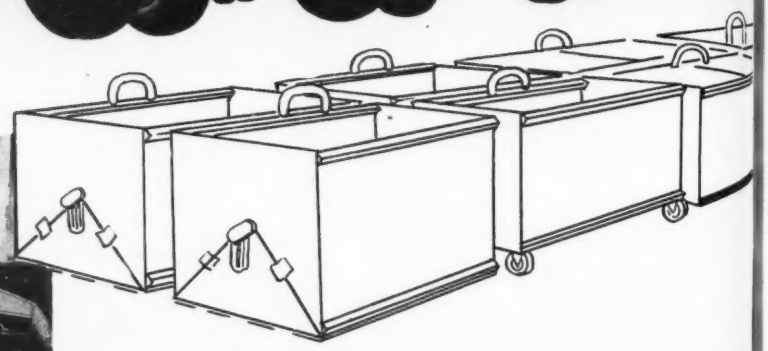


Fig. 10—Schematic layout of differential vapor pressure transmitter

THESE FOUR TRUCKS HANDLE 88 CONTAINERS OF 15 DIFFERENT TYPES



Like many industrial operations, this refinery extends over many acres and handles great quantities of materials, in addition to hundreds of cubic yards of scrap and rubbish daily. Choosing strategic points for receiving material, the 88 containers were placed throughout the refinery, the requirements at each point determining the size and number of containers to be used. At some points for liquid, water-tight containers with lids were required. At others, light, bulky waste called for a big capacity, light-weight enclosed container. Some accumulation points were inside buildings. Containers on casters that could easily be rolled indoors were provided. Each container is assigned to one of the four truck hoisting units and, on a synchronized schedule, is picked up as soon as it is filled. Photos at left show: top-truck hoisting unit backing up to a 6 cu. yd. Universal container. The driver attaches two chains, and then, from controls in the cab, the container is hydraulically lifted into carrying position (see photo at left center). Arriving at the disposal area, the container is automatically dumped (see photo left below). The container is then returned to its original point for reloading and the truck hoisting unit moves on to the next container on its route. Pick-up and dumping operations require only a matter of seconds, thus it is possible for one man and one truck to handle any number of containers, keeping a steady flow of material moving without waiting or wasting time.

On opposite page are illustrated the types of containers in the original installation and the materials they handle. Note how easily the basic Dempster-Dumpster containers are converted for special purposes by the simple addition of lids, casters or some other special change.

The Dempster-Dumpster system is saving money in large and small plants alike. Its great flexibility makes it adaptable to any plant, regardless of size, and assures tremendous savings along with amazing improvements in efficiency. A survey of your plant, without charge or obligation, could reveal the amazing effectiveness of the Dempster-Dumpster System.

DEMPSTER BROTHERS, Inc.

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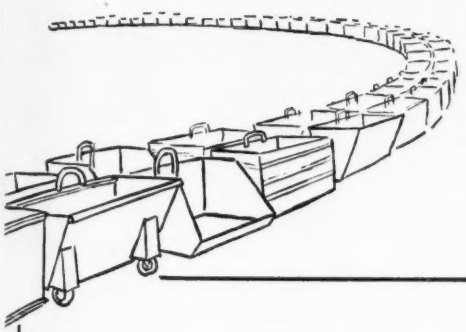
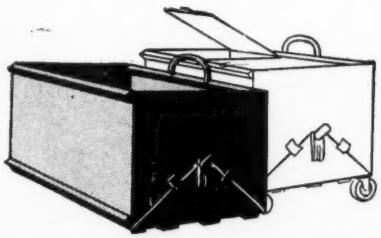
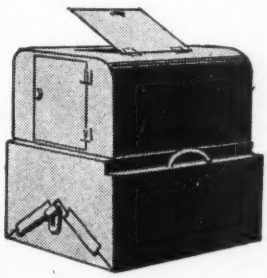


The Dempster-Dumpster System of Materials Handling, simply stated, permits the use of any required number of detachable containers, of various designs and capacities, to be serviced by a single truck. Its ability to effect tremendous savings in handling numerous types of materials has been definitely established in hundreds of leading industrial plants.

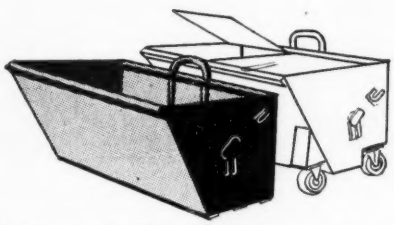
In this particular case, in a large refinery, four of the twelve trucks formerly detailed for materials handling, including scrap and rubbish collection, were equipped with Dempster-Dumpster Hoisting units to handle 88 detachable containers of 15 different types. The Dempster-Dumpster System of quick pick-up and dumping of pre-loaded containers has worked wonders in efficiency, plant appearance, and savings. In one year savings of over $58,000 was shown by our engineers survey. Time has proved the correctness of this survey. Since the original order of 88 containers, so many more uses for the equipment and greater savings were discovered that 55 additional containers have been placed in service with a grand total of 143 containers now being handled by the four trucks.



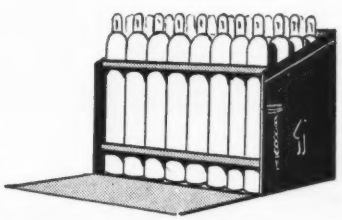
DROP BOTTOM CONTAINERS. 48 drop-bottom containers were furnished for handling trash and rubbish, steel turnings, scrap metal, tube ends and clay:—Twenty 6 cu. yd. open top type, one 6 cu. yd. with lids, nine 2½ cu. yd. open top type, two 2½ cu. yd. open top with casters, six 3 cu. yd. open top, nine 4 cu. yd. with lids, one 4 cu. yd. enclosed with hinged door in top.



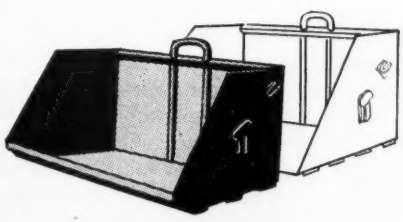
UNIVERSAL CONTAINERS. 13 universal containers were furnished for handling trash and rubbish. Universal containers feature completely enclosed construction, drop-bottom dumping, a door in either end for ground-level loading and a lid in the top for loading from a platform.



TILT TYPE CONTAINERS. 16 tilt type containers were furnished for handling general refuse, sludge and settlings:—Four 3 cu. yd. open top type, nine 3 cu. yd. with lids, three 3 cu. yd. with lids and casters.



SPECIAL CONTAINERS. 3 special containers were furnished for handling and transporting oxygen cylinders from one point to another in the refinery. This container is typical of the many highly specialized uses for which Dempster-Dumpster containers are constructed. Many other containers are available for handling almost any type of material known, be they liquid, dust, light or bulky or very heavy materials.



SKIP TYPE CONTAINERS. 7 skip type containers were furnished for handling refuse wax, oil, lube and coal:—Three 3 cu. yd. skip type with lid, three 3 cu. yd. skip type without lid, one 3 cu. yd. skip type with teeth.

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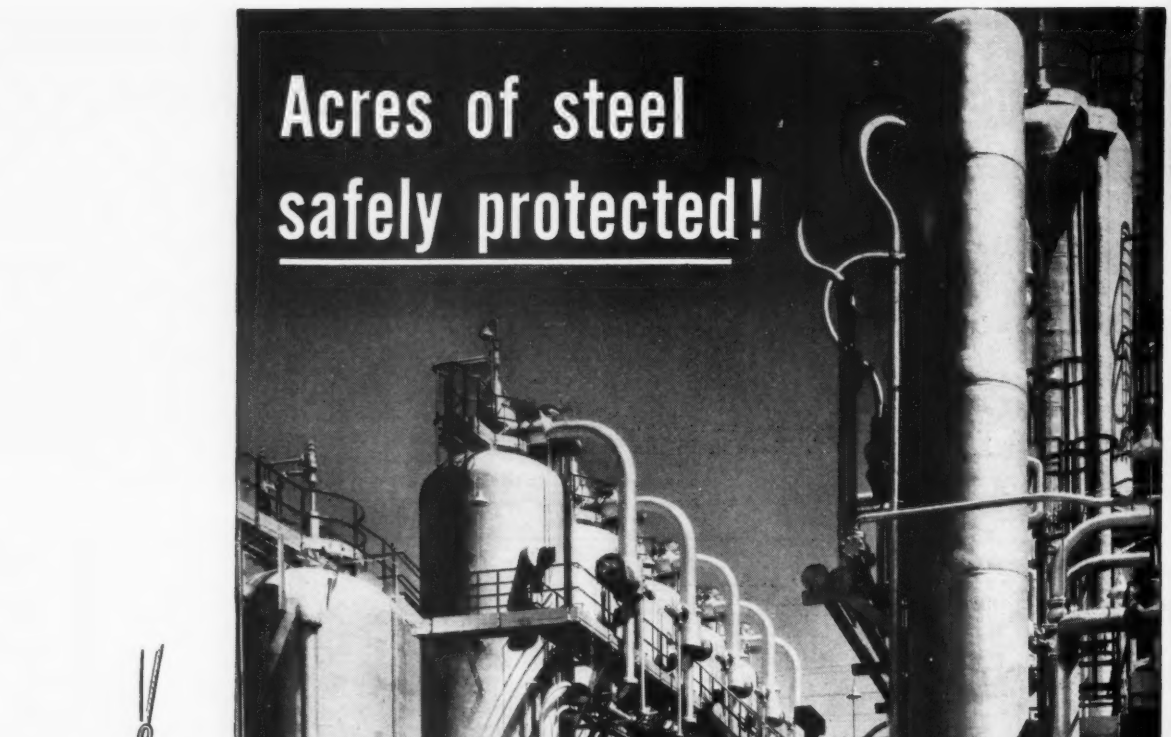

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DIGESTS

DALLAS EXPLORATION SOCIETIES

Digests of papers presented at a joint regional exploration meeting of the Dallas Geological Society and the Dallas Geophysical Society, at Adolphus Hotel, Dallas, November 18-19.

Elimination of Seismic Shot Holes

THOMAS C. POULTER, Stanford Research Institute, Palo Alto, Calif.

OUT of many studies of seismic waves initiated in air, there developed the Poulter method of exploration wherein wave front is controlled in the air so as to strike a maximum area of ground simultaneously. Because of high absorption losses in short distances for large amplitude waves and because of the inverse square law applicable in the case of point sources, explosions in the weathered layer have generally proved unsatisfactory. In air, absorption is slight, a flat wave striking the ground from a source above would therefore contain a relatively large portion of favorable directed explosion energy to which this law would not fully apply.

By the Poulter method, wave motion is initiated by detonating a set of charges so placed in the air as to produce desired wave fronts. Amplitude of shock wave at ground level is purposely kept low to prevent excessive absorption, yet low energy level per unit of area is compensated by simultaneous motion of a large area of ground. Total usable energy is thus sufficient to produce reflections and is transmitted more effectively than a large amplitude impulse from a point source. Advantages in operations and cost are explained.

Pennsylvanian Reef Lawson-Chapman Area, Haskell County, Texas

WALTER L. AMMON, Stanolind Oil & Gas Co., Wichita Falls.

THE Pennsylvanian reef, producing in Lawson field, central Haskell County, Texas, presents certain structural anomalies which seemed best explained by rejuvenation of the eastern side of the reef along the prereef structural axis. It is proposed that this structural axis aided in determining the original location of this reef and the subsea movement along this same axis further influenced the relationship between the reef and the overlying beds. These relationships, if correctly understood, may be of value in exploring for unknown reefs and for locating test wells on newly discovered structures.

Kleiner Mississippian Pool, Eastland County, Texas

PHILIP G. RUSSELL, Lone Star Gas Co., Dallas.

KLEINER Mississippian pool is located in Sections 81 and 82, SPRR Co. Survey, Eastland County, Texas, approximately 1 mile north of Cisco. Oil and gas in the Mississippian limestone was first discovered in December 1947 by Lone Star Producing Co., when its 3 Kincade, an old Lake sandstone gas producer in the southwest part of Section 81, encountered a good section of this limestone while being deepened to the Ellenburger. Full significance of this Mississippian reef was not known, however, until June 1948, when the same company completed its 1-A Kleiner near the center of the W½ of Section 81. This well topped the lime at 3,700 ft. and found the total thickness of the reef to be 357 ft. The upper 200 ft. of the Mississippian section proved to be gas bearing, while the lower 140 ft. contains oil in lenticular zones of porosity and fractures.

Although this lime is generally called a reef, it could perhaps be more properly classified as a bioherm. Discovery of Mississippian production in this field is attributed to surface structure confirmed by seismograph work. A small surface nose, found in 1932 and surveyed by seismograph in 1947, proved to be highly accentuated with depth and indicated the presence of a prominent structural feature with an unusual amount of closure for that general area. In the light of this information it was decided to deepen 3 Kincade and with this operation the presence of the Mississippian reef, or bioherm, was definitely established.

Distribution of Heterostegina Lime, Fannett Field, Jefferson County, Texas

HOWARD HOUGH, Gulf Oil Corp., Houston.

LIME deposits associated with salt domes in the Texas Gulf Coast (caprock excluded) are upper Oligocene in age, occurring in the Heterostegina zone of the Anahuac section. The Heterostegina zone of the Gulf Coast consists of highly fossiliferous calcareous shales with frequent marl beds, grading into a predominant lime section east of the Mississippi River.

The hard lime fringe at Fannett field is several hundred feet thick near the dome and grades outward by facies change to approximately zero. The gradational distance from the dome varies up to 1½ miles, completely encircling the periphery. The determination of 'hard lime facies" is from electrical-log interpretation, and no attempt has been made to determine the cause of the hardness.

Microstructure and Behavior Of the Sediments

EUGENE McDERMOTT (presented by), P. E. HAGGERTY, GALE WHITE, Geophysical Service, Inc., and W. R. RANSONE, E. C. REAGOR of Geochemical Surveys, Dallas.

THIS paper is an effort to describe the sediments in meaningful, useful terms. They may be described in terms of a relatively limited number of kinds of atomic groupings or crystals. The sediments are a mechanical mixture of these crystals. The clay structures are especially important as they compose about 80 per cent of the sedimentary section. The fluids in the sediments are also described. Some of the properties of the sediments are seemingly understandable in terms of these atomic structures—such behaviors as electrical conductivity, change of density under pressure, elastic behavior and so forth. With such a rational frame of reference the direction of needed research becomes clearer.

A Seismic Problem of Faulting

M. W. QUARLES, United Geophysical Co., Dallas.

A DISCUSSION of some seismic shooting in Southwest Texas and possible unique solution in relation to fault interpretation.

A Seismic Problem Encountered Across Faults

E. J. STULKEN, Geophysical Service, Inc., Dallas.

IF effect of overburden upon velocity is overestimated, erroneous depths are computed beneath fault surfaces. Examples show this and the need for correctly appraising velocity changes. Analyses of velocity determinations afford one basis for adjusting data near faults.

History of the Continental Shelf Of the Gulf of Mexico

PAUL WEAVER (President A.A.P.G.), Gulf Oil Corp., Houston.

SOME authors consider the shore line as a hinge line with the land surface uplifted and the shelf downwarped. The author shows that this is by no means the general case and especially describes the geology of the shelf in the Gulf of Mexico.

What Is a Reef?

RONALD K. DEFORD, Professor, University of Texas, Austin.

STRATIGRAPHICALLY, a reef is a product of the biosphere, an immense fossil. As in living reefs the role of plants and animals in building ancient reefs was essential. Reefs built outward against their environment. Most reefs thicken over "highs."

Geophysical Exploration for Limestone Reefs

F. J. AGNICH, Geophysical Service, Inc., Dallas.

IN discussing various geophysical methods in relation to their possible value in locating limestone reefs, special emphasis is laid on the gravity meter and the seismograph. Variations in velocities of seismic waves in reef limestone are considered and the effects on reflections from below a reef body are examined. The relationships between shallow and deep seismic data are investigated, and it is concluded that time isopach maps of such data are extremely valuable. Several methods of detailing limestone reefs are presented. Some suggestions for a program of exploration for reefs are given and the need for "reef mindedness" in interpreters is emphasized.

The Barrier Reef Theory

E. RUSSELL LLOYD, Consulting Geologist, Midland.

THE simplest explanation of a barred basin is a barrier reef separating the basin from more nearly open-sea conditions. The area seaward from the reef may be deep sea like that in front of the Great Barrier reef of Australia; an intracratonic

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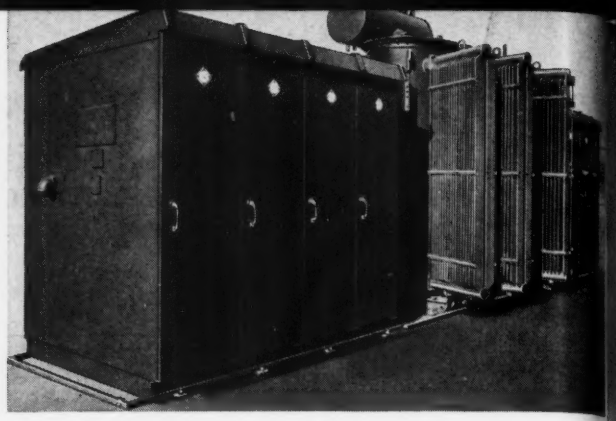

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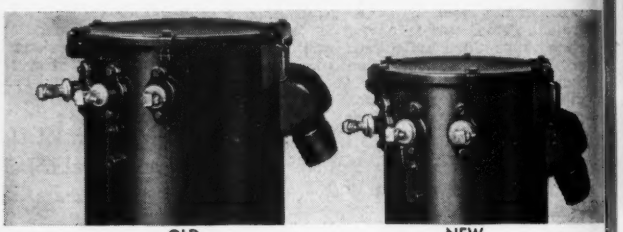

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Smaller in size . . . lighter in weight, (from 17% to 39%) these improved oil-filled distribution transformers are easier to handle and install. New, *orientated core steel* makes these improvements possible. Good operating characteristics have been *wholly retained* . . . are *identical* with those of older heavier units! Tanks are sprabonderized to prevent oxidation and to form an ideal surface for *three baked-on* coats of all-weather paint. Copper to oil temperature gradients are minimized, resulting in better short time overload characteristics. In ratings from 1½ to 100 kva, voltages from 2400 to 15,000. All units meet EEI-NEMA specifications. New 12 page bulletin 61B6159B gives complete information.

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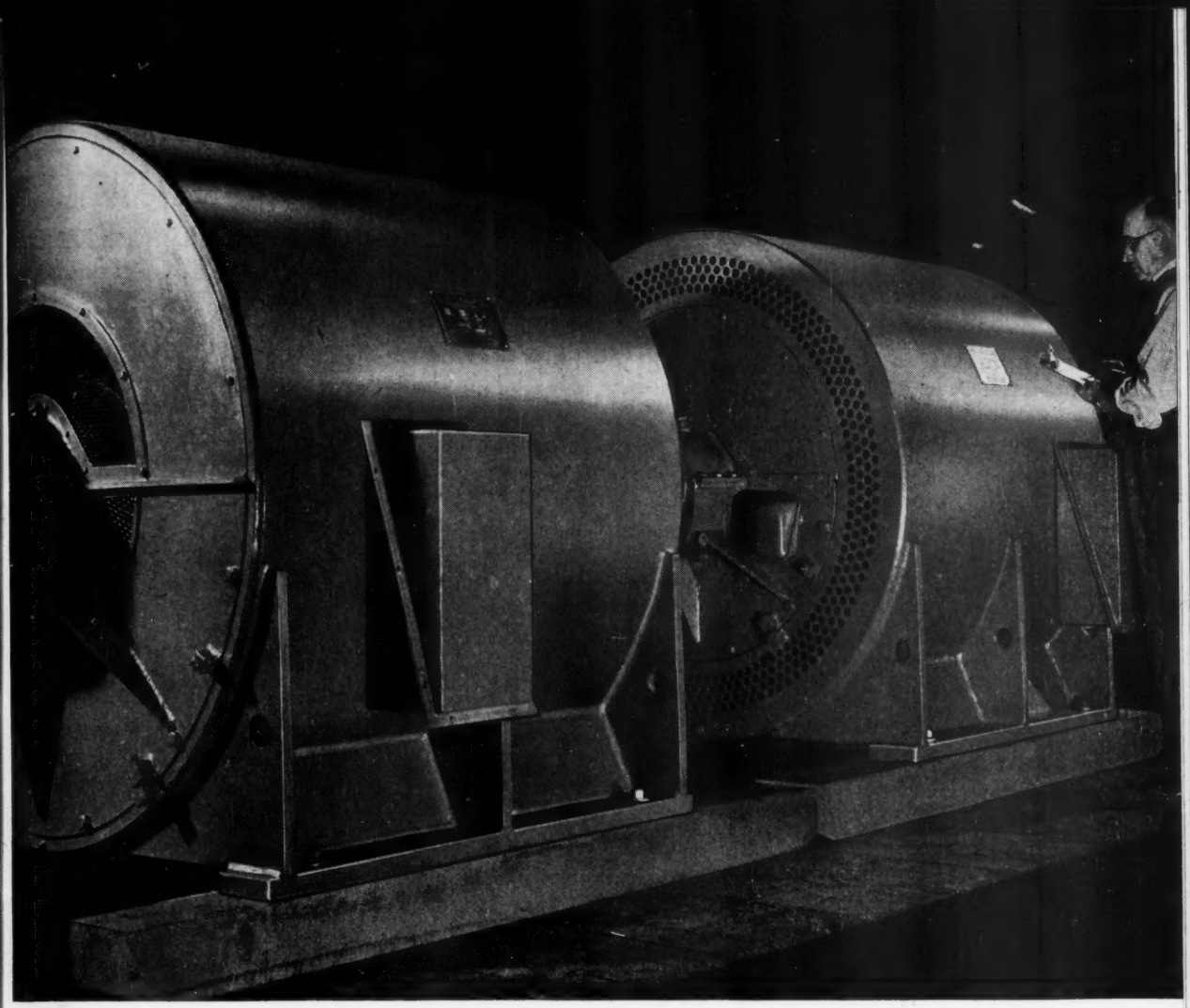

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COMPLETELY NEW, designed originally for hazardous refinery locations, these motors have been built to date in sizes up to 1250 hp. This new line has already found broad usage in petroleum and other industries. On pipe lines — in refineries, oil men have found these new motors fully meet application requirements.

Utilization of an entirely new principle of sealing and cooling has made these motors *practically self-cleaning . . .* has enabled designing sizes up to *2000 hp and larger.* Because of their unique construction, motors are protected from damage by salt air, fog, rain, fly-ash, coal dust and soot . . . they can withstand conditions of *both outdoor and indoor operation!*

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basin like the Delaware basin of Guadalupian time; or a true geosyncline.

The area back of a barrier reef may be designated as lagoon, barred basin, back reef area, shelf sea, or epicontinental sea. Its water may range in composition from highly saline to brackish. Wherever an extensive evaporite sequence is found an associated barrier reef may be expected. Similarly extensive limestone or dolomite sequences may be limited by barrier reefs. The Great Barrier reef of Australia is the outstanding example of a present-day barrier reef and its lagoon is an epicontinental or shelf sea.

Pennsylvanian Reef at Todd Field, Crockett County, Texas

ROBERT F. IMBT, Consulting Geologist, Fort Worth; S. V. McCOLLUM, Continental Oil Co., Fort Worth.

CRINOIDAL limestone of Strawn age was found productive in Todd field with the completion of Continental-Stanolind et al 2 Todd Unit in April 1940. The discovery well was drilled on the basis of subsurface geology and produced between 5,590-5,690 ft. The Strawn producing area lies on the west side of the Todd structure, a sharp fold defined in part by faulting. The reservoir rock ranges up to 400 ft. in thickness and virtually the entire section grades laterally into black shale eastward across the fold.

Dundee Area, Archer County, Texas—Sand Production Related To the Pennsylvanian Reef

JACK E. KADANE, Independent Operator, Wichita Falls.

THIS paper, on the basis of subsurface and seismic data, demonstrates the relationship between the producing sands, the K.M.A. lime and lower members of the Strawn reef.

Vealmoor Field, Howard County, Texas—A Pennsylvanian Reef

S. J. TAYLOR and H. C. McCARVER, Seaboard Oil Co., Dallas.

VEALMOOR field of northern Howard County produces from reef limestone of Upper Pennsylvanian age. Field was discovered in January 1948 by Seaboard Oil Co., Comanche Corp., and Brown Brothers as a result of seismic exploration. Subsurface and seismograph maps and cross-sections show relationship of structure and sedimentation to the reef limestone.

Limestone Development in the Pennsylvanian of the Eastern Permian Basin

FRANK B. CONSELMAN, Consulting Geologist, Abilene, Tex., J. W. CONLEY, Seaboard Oil Co., Abilene, Tex.

THIS paper presents the results of a study of limestone distribution within the major divisions of the Pennsylvanian series in the eastern Permian basin of Texas. Areas in which limestones and other carbonates have been developed are shown graphically in their relationship to nearby areas in which clastics predominate.

The regional study offers a background for an analysis of the local factors contributing to reef formation. Relative proportions of carbonate rocks have been determined for the Cisco, Canyon, and Lower Pennsylvanian subdivisions of the Pennsylvanian of the eastern Permian basin and maps are presented which show the areas of maximum limestone development with reference to the occurrence of reef-type reservoir rocks.

Jameson Field, Coke County, Texas

W. H. CONKLING, Sun Oil Co., Midland, Tex.

JAMESON field was discovered in December 1946 by Sun Oil Co. 1 Allen Jameson, originally completed at 6,245 ft. and subsequently deepened to 6,407 ft., total depth. Production is from reef limestone of Lower Pennsylvanian age. Surface structure was recognized as a result of surface work done in 1923, and later was confirmed by seismograph.

A Precision Detail Gravity Survey of the Jameson Area, Coke County, Texas

HART BROWN, Brown Geophysical Co.; Geophysical Associates, Houston.

SINCE few, if any, conventional gravity surveys of the Jameson area produced a significant gravity anomaly, an experimental high-density gravity survey was conducted immediately following the field discovery. A station density of 16 per square mile was achieved. Great pains were taken to obtain higher than customary precision of each field measurement. Careful terrain corrections were applied. Maps of raw and of residual gravity are presented. Subsequent drilling has revealed an apparent correlation between the gravity and the limestone reef.

Shoran as a Surveying Method For Marine Geophysical Exploration

CARL H. KELLER, Atlantic Refining Co., Morgan City, La.

A NONTECHNICAL discussion of the basic theory of shoran, the equipment used and the manner in which it has been adapted as a surveying method for marine exploration along with some of the problems and difficulties which have been encountered in its use.

BOOKS

REPORTS PREPARED FOR SECOND SESSION OF INTERNATIONAL LABOR OFFICE PETROLEUM COMMITTEE. Published by International Labor Office, 1825 Jefferson Place, Washington 6, D. C. $2.50.

This meeting beginning November 9, 1948, in Geneva, Switzerland, brought together representatives of governments, employers, and workers from 12 countries: United States, Canada, Colombia, Egypt, France, United Kingdom, Iraq, Iran, Mexico, Netherlands, Peru, and Venezuela. The five reports cover the following subjects: Record of the First Session (1947); Report I—General Report; Report II—Recruitment and Training; Report III—Safety in the Petroleum Industry, and Report IV—Industrial Relations. The General Report consists of three chapters, the first of which gives an account of the action taken in the light of resolutions adopted by the Petroleum Committee at its first session. Chapter 2 contains information of hours of work in the petroleum industry, with some comments on labor statistics. In Chapter 3 a brief account is given of some of the developments which have taken place in the petroleum industry since the first session of the committee.

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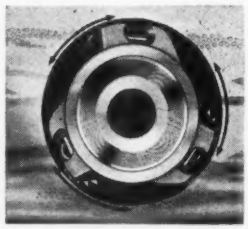

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Inhibited Hydrochloric Acid Has Many Applications in the Petroleum Industry

*by Guy F. Williams**

THE petroleum industry is continually finding applications for inhibited hydrochloric acid. Many times, a few gallons properly used will prevent damage to equipment, lower operating costs, reduce shutdown time, and increase operating efficiency. Its use has resulted in improving production from old, low-productivity wells, thus indirectly increasing the nation's recoverable oil reserves. It is also used to clean up water and oil flow lines, and to descale cooling systems, oil-field boilers, and numerous types of refinery installations. It has an application wherever scale deposits are decreasing operating efficiency.

The accumulation of scale in the water jackets of water-cooled internal-combustion engines is a serious and ever-present problem. It causes overheating of the engines, loss of power, cracked heads and cylinder walls, and necessitates frequent shutdowns for scale removal and repairs. The longer the scale is allowed to accumulate, the thicker the deposit becomes and the more difficult and costly it is to remove.

The effect of various types and amounts of scale deposits on the efficiency of heat-exchange equipment is shown in Table 1.

TABLE 1—PER CENT HEAT LOSS WITH VARIOUS SCALES*

Thickness scale (in.)	Soft carbonate	Hard carbonate	Hard sulfate
1/50	3.5	5.2	3.0
1/32	7.0	8.3	6.0
1/25	8.0	9.9	9.0
1/20	10.0	11.2	11.0
1/16	12.5	12.6	12.6
1/11	15.0	14.3	14.3
1/9	...	16.0	16.0

*Data from a report by University of Illinois which show the approximate heat losses that may result if scale is allowed to accumulate to various thicknesses.

The scale accumulations ordinarily found in internal-combustion engines are usually acid soluble and may be removed efficiently by the use of chemicals. Information on the composition of the scale should be obtained before attempting removal, in order that the proper chemical mixture be used. If a representative sample of the scale is found to be readily soluble in acid, further testing will not be required. However, many forms of such deposits are not easily dissolved in ordinary acid and it may be necessary to use numerous auxiliary addition agents capable of imparting to the treating mixture maximum solubility effects.

Conventional qualitative and quantitative analyses are slow, expensive, and while they provide accurate knowledge of the constituents composing the sample, a much simpler and more rapid analysis can be obtained by the X-ray method.

This method is relatively inexpensive, accurate, and rapid. The representative scale sample is crushed to a powder and the analysis obtained by securing its diffraction pattern and resolving the lines of this pattern by comparison with standard patterns readily available in the X-ray laboratory.

Procedure to Remove Scale

The simplest and most economical manner of removing scale from the cooling jacket of an engine is to circulate a 15 per cent (10° Be.) inhibited acid solution through the cooling system. In order to remove scale in this manner a suitable pump should be used to circulate the acid. If the engine is small a hand-operated pump will suffice, but if the system to be cleaned is large and the time element is a factor, a motor-driven pump should be employed. The pump intake should be connected to the acid tank and the pump discharge line to the intake on the engine-cooling system. A return discharge line connecting the cooling system and the acid storage completes the hookup.

Fig. 1 illustrates a suggested arrangement of the equipment used. By circulating the acid through the engine cooling system and into the acid tank, a continuous cycle is possible. The circulation is kept up until the scale is dissolved. A sample of the fluid returned to the acid tank will reveal when the scale is removed. When the concentration of the acid remains constant over a long period of time it can be assumed that the soluble part of the deposit has been removed.

If the chemical removal process is used it is advisable to shut the engine down before starting the acid circulation. The temperature of the engine should be 150° or less. This is recommended in order that the temperature will not be sufficiently high to cause excessive acid corrosion. If the scale analysis reveals that in order to secure more complete removal of the scale, heat is desirable, plans should be made to heat the acid to the recommended temperature and to maintain it at this temperature during the operation. In some cases where high temperatures are required (never go beyond 150° F.), special inhibiting compounds may be necessary to keep the acid corrosion to a minimum.

After the scale is removed, the cooling system should be thoroughly flushed with water in order to remove all of the spent acid, its resultant reaction products, and all the

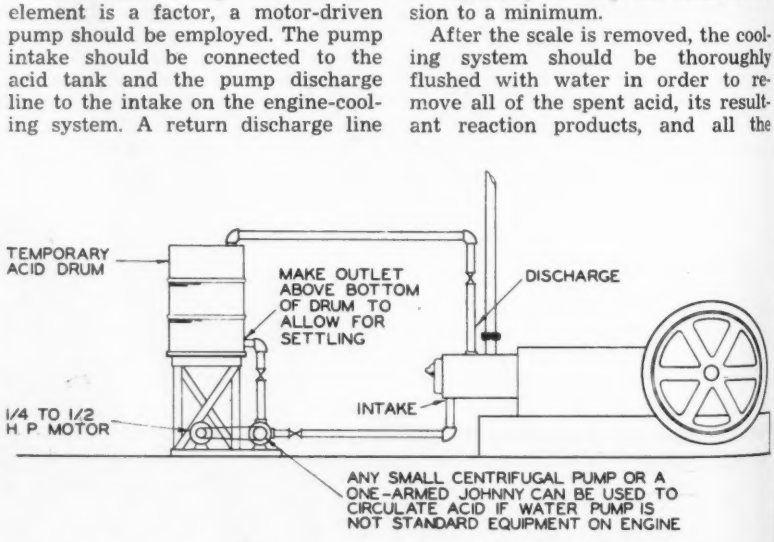

TEMPORARY ACID DRUM
MAKE OUTLET ABOVE BOTTOM OF DRUM TO ALLOW FOR SETTLING
DISCHARGE
INTAKE
1/4 TO 1/2 H.P. MOTOR
ANY SMALL CENTRIFUGAL PUMP OR A ONE-ARMED JOHNNY CAN BE USED TO CIRCULATE ACID IF WATER PUMP IS NOT STANDARD EQUIPMENT ON ENGINE

Fig. 1—Water-deposited scale may be removed quickly and effectively from engine-cooling jackets through the use of inhibited hydrochloric acid

*Dowell Incorporated, Tulsa.

material dislodged by the application.

The amount of acid used depends upon the thickness of scale deposit and the capacity of the cooling system to be cleaned. Each model engine generally has a different cooling capacity. However, in order to give a general idea of the amount of acid to use, one 12 by 15-in. engine with a 3-in. annular space water jacket will hold approximately 12 gal. One filling with 15 per cent acid should remove a scale deposit 1/20 in. thick. Therefore, if the scale is 1/5 in. thick, 48 gal. of 15 per cent would be required. In order to have an adequate safety factor, 85 to 100 gal. of acid should be used. The average cost for the acid required to do this work in the Mid-Continent area would be, at present prices, less than $25.

Scale in Well Equipment

Wherever water is produced with oil, it is not unusual to find various types of scales deposited in the tubing, casing, working barrel, and on the face of the producing formation. In some fields these scale accumulations constitute a serious operation problem. In some pools in the Corpus Christi area it is not uncommon to find the 2½-in. tubing of gas lift wells badly sealed from the surface down for a distance of 1,500 ft. Ordinarily, the scale is allowed to accumulate until it attains a thickness of 1 in. or more, then removed with inhibited acid to which a foaming agent has been added.* The foaming agents cause the acid to become frothy when it comes in contact with the scale, which gives greater volume, thus tending to keep the acid in contact with the scale for a longer period of time than would be the case with ordinary acid.

Chemical treatments on wells of this type are frequently made introducing approximately 250 gal. of inhibited foaming acid down the tubing (see Fig. 2). The well is then shut in for about 1 hour to allow the acid to work down the tubing, following which it is opened up and the acid

*Process Patent No. 1989479 of the Dow Chemical Co.

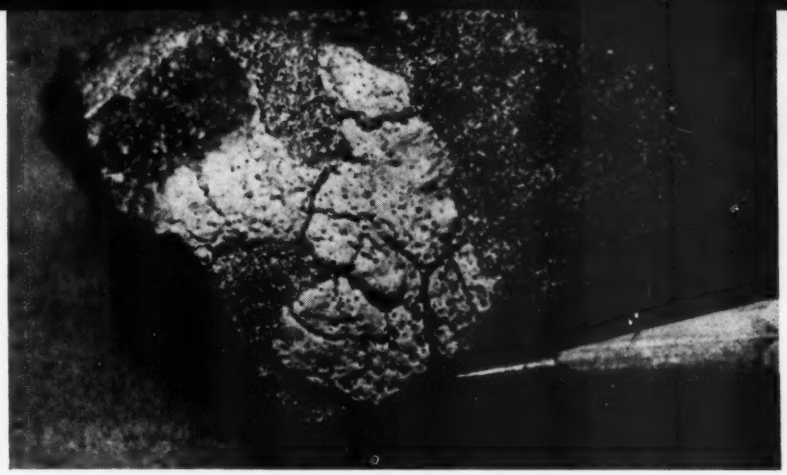


Fig. 3—Acid-soluble scale on the face of a producing formation can be removed by the proper application of inhibited hydrochloric acid

TABLE 2—RESULTS OF ACID CLEANUP ON OLD WELLS IN WEST TEXAS

Well No.	Test before treating		Gal. acid used per well	Test after treating		Per cent oil inc.
	Oil	Water		Oil	Water	
9	8.50	31.25	126	8.50	31.25	0
9 (repeat)	8.50	31.25	70	16.56	118.80	94.8
31	5.76	43.20	120	47.52	195.00	725.0
32	4.32	159.84	150	0	69.12	—100.0
38	14.40	100.80	150	20.16	164.16	40.0
40	4.32	79.20	110	8.64	86.40	100.0
40 (repeat)	8.64	86.40	100	6.48	82.08	—25.0
41	33.12	68.42	150	88.56	192.00	167.4
42	11.52	146.88	75	13.68	107.28	18.8
42 (repeat)	13.68	107.28	225	18.72	286.28	36.8
46	14.40	158.40	150	8.68	141.80	—39.7
60	12.96	131.76	100	13.68	139.96	5.5
71	4.51	56.39	100	4.51	56.39	0
71 (repeat)	4.51	56.39	100	4.51	88.06	0
79	2.88	61.92	120	2.88	61.92	0
79 (repeat)	2.88	61.92	150	7.20	69.12	150.0
81	18.04	38.33	150	7.89	68.87	—56.3
84	1.44	35.28	168	1.44	35.28	0
86	7.20	47.52	150	8.64	250.44	20.0
87	18.04	46.25	200	18.04	46.25	0
87 (repeat)	18.04	46.25	200	64.29	58.87	256.4
89	8.64	40.32	120	20.16	188.64	133.3
93	14.40	100.80	150	40.32	215.16	180.0
108	7.89	83.55	110	8.02	79.02	14.3
108 (repeat)	9.02	79.02	150	76.73	131.72	750.7
117	.72	12.96	168	1.44	13.68	100.0
122	4.00	0	84	6.00	0	50.0
122 (repeat)	6.00	0	50	6.00	0	0
143	5.68	24.08	150	2.88	244.68	49.3
159	23.76	56.16	250	25.92	208.78	9.1
166	5.00	7.72	84	5.76	164.88	15.2
167	31.56	62.14	200	25.92	36.72	—17.9
168	9.02	71.11	100	9.02	71.11	0
168 (repeat)	9.02	71.11	150	34.95	273.03	287.5
171	15.78	65.48	150	33.82	277.60	114.3
174	17.28	19.44	160	14.40	32.04	—16.7
2-B	20.88	104.40	150	30.24	145.44	44.8
5-B	11.52	183.60	100	21.60	156.96	87.5

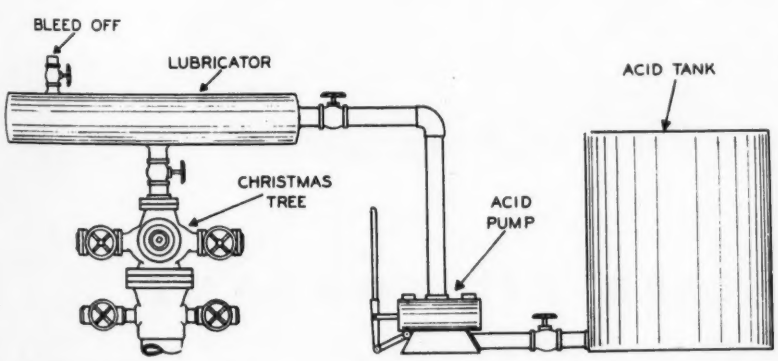
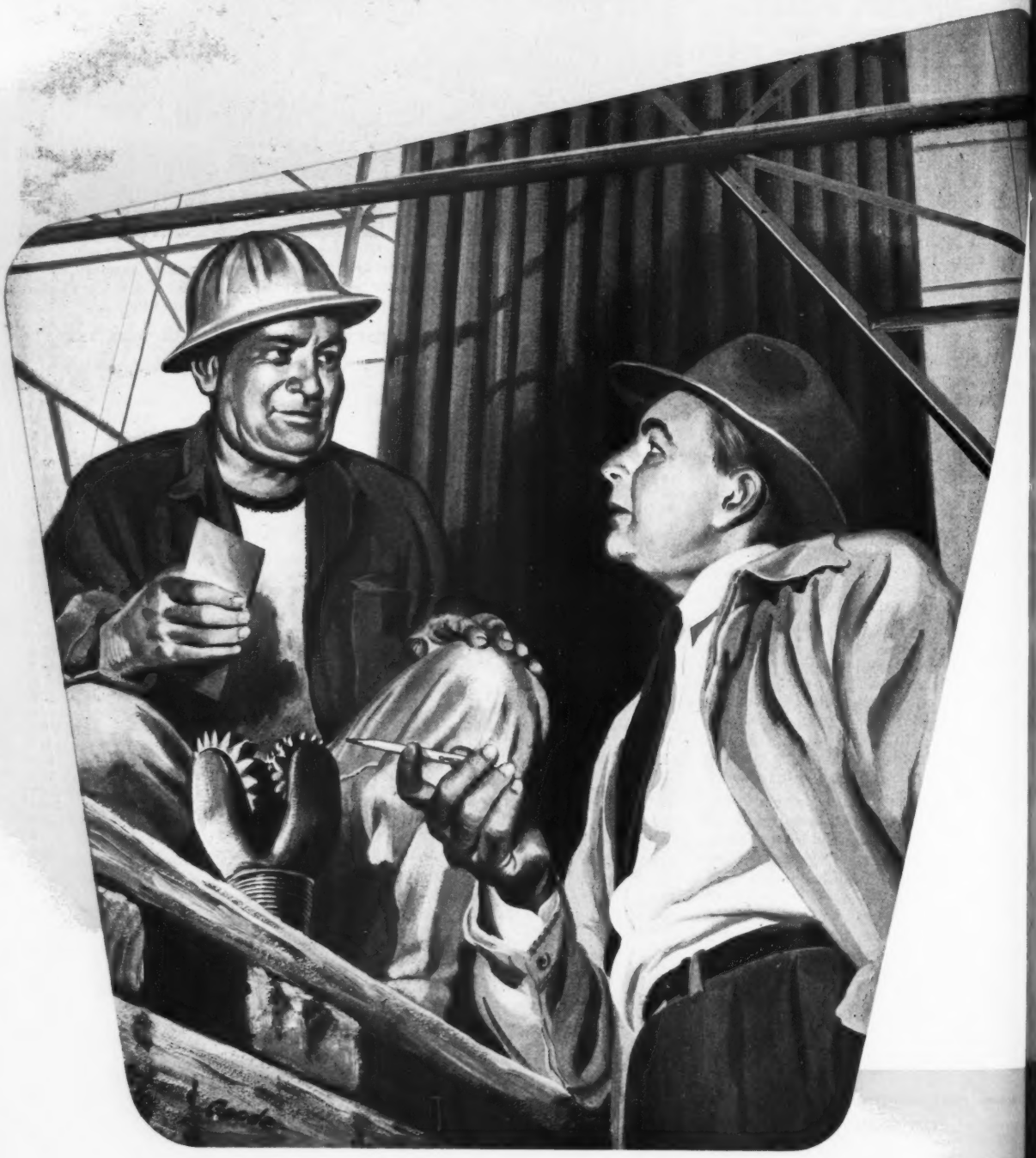


Fig. 2—Inhibited hydrochloric acid can be applied to a flowing well through a lubricator, as illustrated here

column lifted to the surface to be returned to the scale deposit by merely shutting the well in again. This cycle is repeated three or four times and then the partially spent acid is allowed to run through the lead lines into the gun barrel from which it is later withdrawn with the water produced from the well.

In wells where the scale forms in the lower part of the well it causes serious pumping problems, frequent pulling jobs, and repairs and replacement of equipment. Chemicals may be used to remove acid-soluble scale deposits of this type by introducing about 50 to 100 gal. of inhibited acid slowly into the annular space between

Teamwork with the men in the field . .



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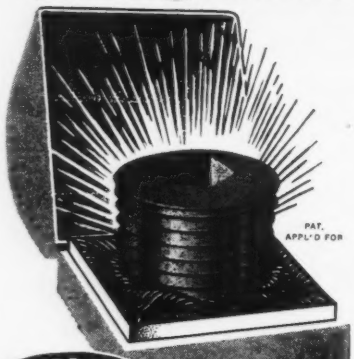

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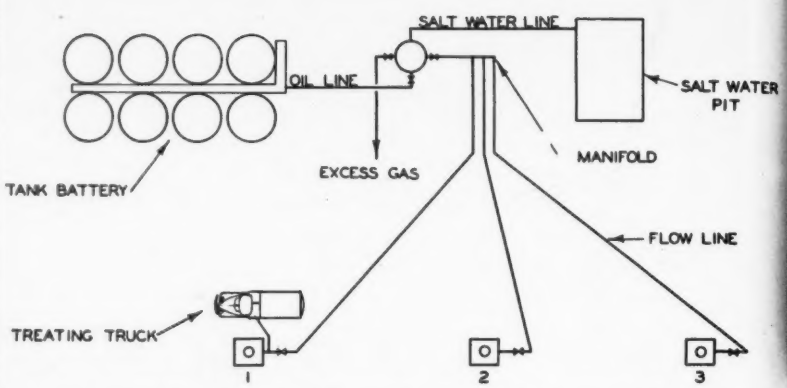

Fig. 4—The above hookup was used in removing scale from the tubing and flow lines of three producing wells. The truck was moved from well to well during the job

the tubing and the rods after the tubing has been unloaded. The acid is usually allowed to react with the scale for about 2 hours, then the well is pumped for 1 hour and then shut in again while an additional 50 gal. of acid is put into the tubing.

Following a treatment of this type in Hamlin field of North Central Texas, the rods and tubing were pulled and it was found that all parts of the well equipment were free of scale. Prior to treatment it was impossible to pull the rods from the well due to the scale deposits.

Scale on Well Face

In instances where the scale builds up on the face of the pay, as shown by the sample illustrated in Fig. 3, and on the outside of the tubing and on the screen it is the practice to introduce the inhibited acid into the casing. This method permits the acid to come into contact with the deposit at the bottom of the well and if the scale is soluble it effects a complete, rapid, and economical removal of the scale.

In old wells producing from limestone or dolomite where it is economically impractical to use conventional acidizing methods, worth-while production increases can be obtained frequently by using bulk acid which may be introduced into the tubing or casing in amounts varying between 100 and 500 gal. depending on pay thickness and production history. The economy of such types of treatments is illustrated in Table 2 which shows the results obtained by bulk acid treating of old wells in West Texas. An average of 136 gal. of inhibited acid was used per well resulting in an average production increase of 76 per cent per well.

The average cost of the acid used was approximately $40 and the value of the additional daily production was approximately $10. The well were tested about 1 week after treating and with the exception of three wells all of them paid out the cost of the acid in approximately 3 to 5 days. Most of the treatments were made by pouring inhibited acid down the tubing after the rods were removed. All the wells were flushed with an amount of oil equivalent to the volume of acid used.

Oil-treating heaters, flow lines (see Fig. 4), water-disposal lines, and lead lines that scale up have been successfully cleaned with inhibited hydrochloric acid, and many companies use this method of cleaning.

Pipe fittings, valves, and nipples may also be cleaned with inhibited acid successfully. Iron oxide or rust, scale, and cement can be removed by immersing the object in a container of 15 per cent inhibited hydrochloric acid for an hour or so. After removal from the acid, the fitting should be thoroughly washed with water to remove the acid. If the fitting is to be put in storage it should be painted immediately or oiled to prevent rusting.

Many types of heat exchangers, boilers, refinery equipment, compressor, and large engine-cooling systems are regularly treated with bulk acid for the removal of troublesome scale deposits. However, the cleaning of the large industrial installations is generally done by companies who render an expert professional service in this field. Usually, large industrial scale-removal operations require special equipment and detailed data on metallurgy, corrosion problems, and an ample background of experience in such work.

Richardson Keystone Field Plant Nears Completion

Completion of the Sid Richardson Gasoline Co. plant, which is now under construction in the Keystone field, near Kermit, Tex., is scheduled for February 1949.

The plant, which will have a daily natural-gas capacity of 130,000,000 cu. ft., will produce approximately 100,000 gal. of propane and butane and 100,000 gal. of natural gasoline daily. Jones & McLaughlin Supply Co. has the contract.

Uninterrupted Service

assured by these

PARKERSBURG INDIRECT HORIZONTAL HEATERS

There'll be no trouble with frozen control and separation equipment on this flowing system. With these Parkersburg Indirect Horizontal Heaters in service there will always be sufficient heat in the flowing system to prevent the formation of ice crystals.

The dependability of Parkersburg Heaters is assured by their simplicity of design . . . their highly efficient combustion equipment . . . the highest standards of material and workmanship that are typical of all Parkersburg products.

Put your high pressure gas wells on uninterrupted service with Parkersburg Indirect Horizontal Heaters. Talk to your nearest Parkersburg Representative for details about your specific installations.

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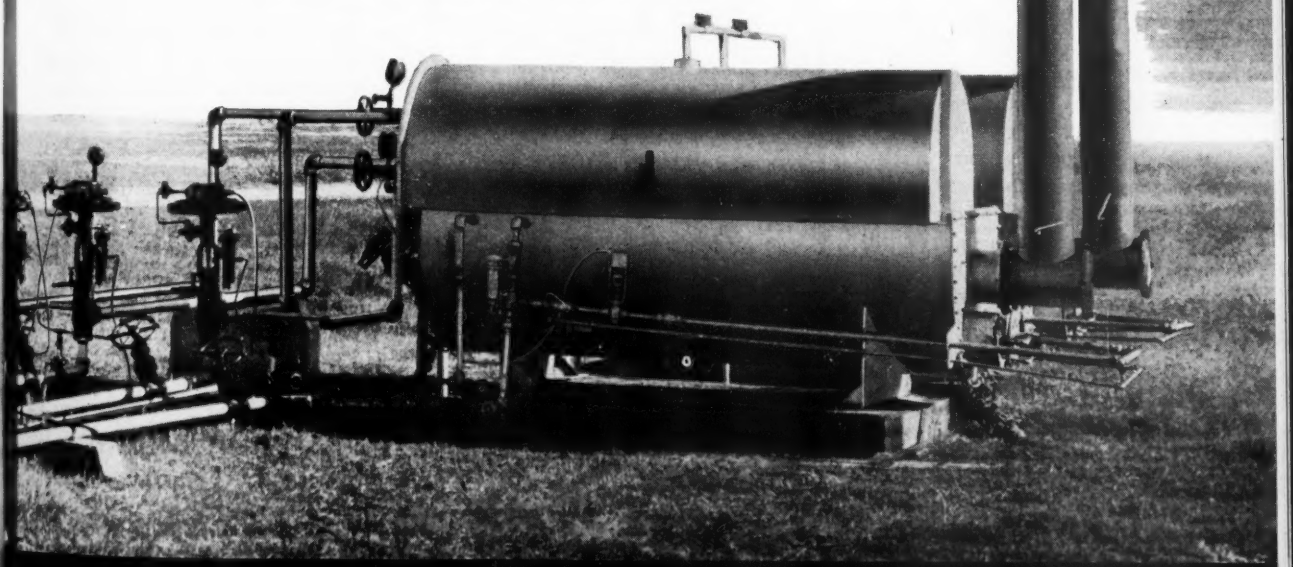


PARKERSBURG

When Well Conditions Demand A

NOT only does the Baker Model "D" Retainer Production Packer take care of the "every day," simple installations, but it is adaptable to many of those previously difficult or impossible applications.

This is due first to the construction of the Packer itself, employing two sets of opposing slips, with a Hycar packing element between them, so that the Packer virtually becomes a part of the casing, cannot be moved up or down the casing, and prevents fluid or gas from passing between the packing element and the casing. When the Setting Tool, used to set the Packer, is removed from the well, only the smooth-bore Packer is left in the well, securely packed-off, and ready for selection and use of the proper Baker Packer Accessory Equipment to meet production requirements.

ACCESSORY EQUIPMENT IMPORTANT

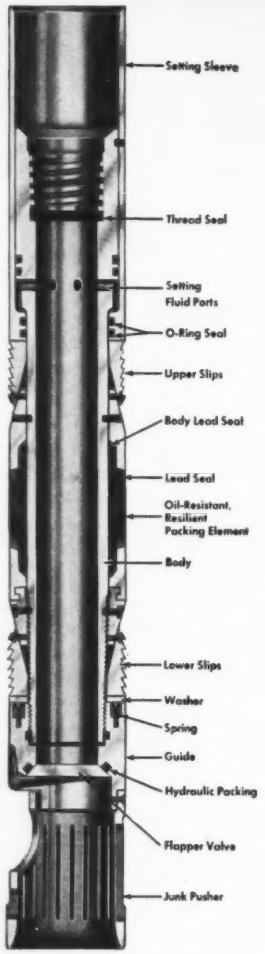
It is the complete line of Accessory Equipment that is responsible for the outstanding adaptability of Baker Packer installations to produce one or more zones, simultaneously or separately—through tubing or casing—and often with flexibility to permit production changes without pulling the tubing string.

One interesting and useful accessory unit is the Baker Tubing Seal Nipple, Multi-V Type (Product No. 448-D) which is an important element in many Packer installations to effect a fluid-tight seal in the annulus between the tubing string and the internal smooth bore of the Packer. This unit permits movement of the tubing string, either up or down, over the length of the Packer bore; and, for additional movement more than one Multi-V Tubing Seal Nipple may be used, as shown in Figure 1 on the opposite page.

CONVENIENT LATCHING SUB

The Baker No Left Turn Latching Sub (Product No. 473) is positioned in the tubing string just above the Tubing Seal Nipple. This ingenious device does not effect a seal, but provides a quick-engaging, positive hold-down for the tubing production string, and holds the Tubing Seal Nipple in proper position in bore of Packer where it cannot be moved upward or downward by expansion or contraction of the tubing string.

Inasmuch as no "set-down" weight is required for operation of this Sub, the tubing can be suspended in tension, if desired, so that pressure bombs (and other devices) may be dropped readily through the tubing. Operations are not handicapped by "corkscrewed" tubing which often results when set-down weight is applied to conventional type packers.



Baker Model "D" Retainer Production Packer Product No. 415-D

BAKER TUBING SEAL NIPPLE, MULTI-V TYPE, which effects a fluid-tight seal between the tubing string and the bore of the Packer.

APPLICATIONS ARE MANY AND VARIED

In addition to the fact that the Baker Model "D" Retainer Production Packer is used for single-zone or multiple-zone production applications, it is ideal for isolating casing, for salt water disposal, for acidizing, re-pressuring, and many other applications.

Other features which appeal to veteran production men are its Complete Drillability—Resistance to High Temperatures—Corrosion-Resistant Construction—Freedom of the Tubing from the Packer—and Positive Anchoring Against Upward or Downward Movement.

Descriptions, illustrations and specifications are in your 1948 Baker (or Composite) Catalog; a new brochure covering the Baker Retainer Production Packer will soon be off the press ready to mail at your request; and Baker representatives in every active area are anxious to serve you.

BAKER OIL TOOLS, INC.
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Demand a BAKER Model "D" R

A PRODUCTION PACKER

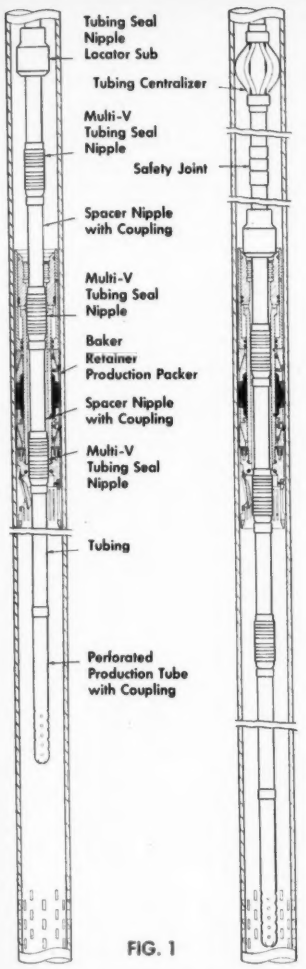


FIGURE 1—(left)

This single-zone installation is recommended where it is necessary to compensate for variations in the length of the tubing string, and to prevent excessive weight being imposed upon top of Packer when extreme increases in bottom hole temperatures cause expansion of tubing.

Three Baker Tubing Seal Nipples, Multi-V Type, are used, and spaced so that one Nipple is always sealed off in the bore of the Packer. The desired length of the tubing string is determined, to permit proper spacing of the Multi-V Nipples in the Packer and allow for proper connection at the tubing head. The tubing string is run into the well until the Baker Locator Sub contacts the top of the Retainer Production Packer. The tubing is then raised to remove the Seals from the Packer, to permit circulating and unloading the mud from the well. When the well has been unloaded, the tubing is set down and the final Christmas tree connections made.

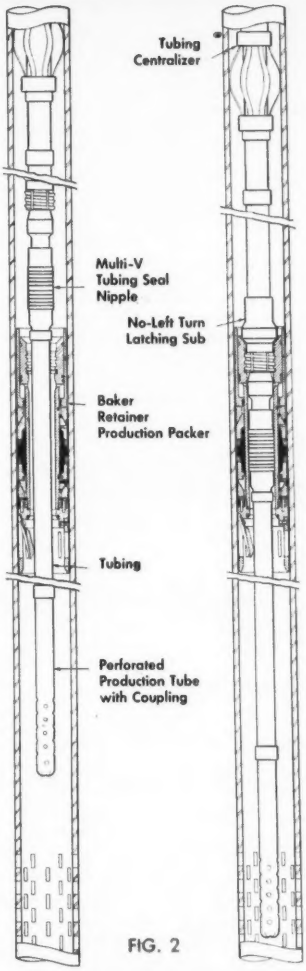


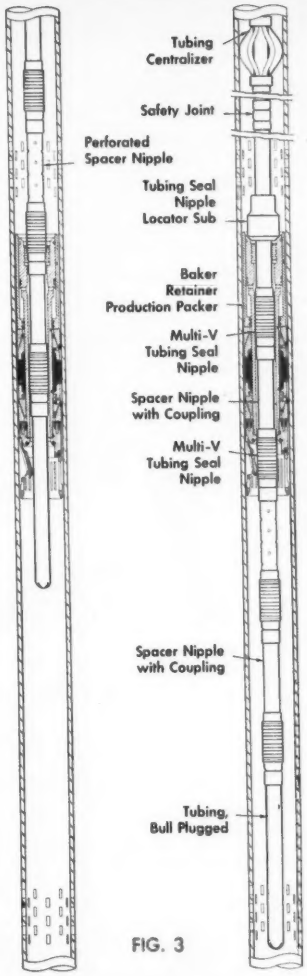
FIGURE 2—(center)

This hook-up is for producing a single zone with the production string anchored to the Packer, an advantageous feature when it is desired to: (a) produce the zone by pumping, while keeping the production string in tension; or (b) produce the zone by flowing without having to impose excessive weight on the Packer in order to hold the Tubing Seal Nipple properly positioned in the Packer bore; or (c) high pressure injection of gas or fluid for re-pressuring or secondary recovery.

The production string is run in the casing until the No Left Turn Latching Sub rests on top of the Packer. This is indicated at the surface by a drop in weight recorded on the strain indicator or the weight indicator. The production string is then raised approximately five feet, and in this position the zone may be washed and brought in, if it will flow.

FIGURE 3—(right)

This two-zone hook-up permits washing the upper zone and unloading the annulus; or the upper zone may be killed through the tubing without running a side door choke on a wire line. The casing head used must pack off while the tubing is being raised or lowered. The Packer is set close below the upper zone, and the production string (made up as shown in Figure 3) is run in until the Locator Sub rests on top of the Packer, indicated by a drop in recorded weight on the strain indicator.



To wash the upper zone, or to unload the annulus, the string is raised about 8 feet to bring the Perforated Spacer Nipple above the Packer, but with the lower Tubing Seal Nipple inside the Packer bore. After the upper zone is brought on production through the casing annulus, the production string is lowered until the Locator Sub rests on top of the Packer. Weight of 10,000 pounds, or more if desired, may be set on the Packer, and the lower zone brought in through the tubing, by swabbing if necessary. To kill the well later, the lower zone is killed through the tubing; the production string raised (left view) and the upper zone killed. The production string is the removed from the casing.

Product No. 415-D

D" Retainer Production Packer

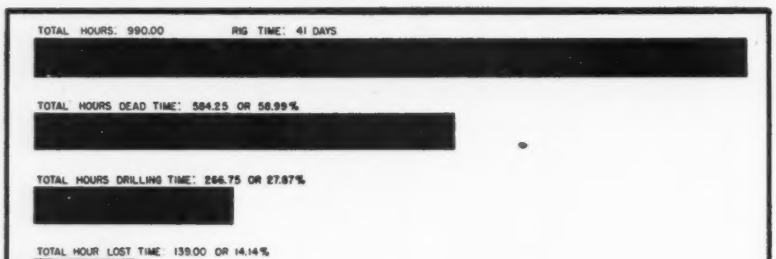

TOTAL HOURS: 990.00
RIG TIME: 41 DAYS
TOTAL HOURS DEAD TIME: 564.25 OR 56.99%
TOTAL HOURS DRILLING TIME: 266.75 OR 27.97%
TOTAL HOUR LOST TIME 139.00 OR 14.14%
TOTAL NUMBER ROUND TRIPS FROM SIDETRACK POINT - 80
TOTAL NUMBER LIVINGSTON-SHRADER KNUCKLE GUIDES SET - 7
TOTAL NUMBER SINGLE SHOT SURVEY RUNS - 37
TOTAL FOOTAGE DRILLED FROM SIDETRACK POINT - 2824 FEET
AVERAGE ANGLE MAINTAINED - 30° 20'
EXPLANATION:
DEAD TIME - TRIPS, CHANGING HOOK-UP, CONDITIONING MUD, RUNNING SURVEYS, REAMING, ETC.
LOST TIME - WAITING ON ORDERS, CEMENT, WEATHER, FUEL, EQUIPMENT, ETC.

Fig. 1

51° Angle Reached in Mississippi Well

by Ralph Walker*

A WELL which was of great interest to directional-drilling-minded Gulf Coast operators was recently drilled for The California Co. by Noble Drilling Corp. near Vicksburg, Miss. Through directional drilling a maximum of 51° was reached to perform the required deflection. Directional-drilling supervision was carried on by The Livingston-Shrader Co. of Liberty, Tex.

Known as the 1 Mattie H. Johnson, the well originally was drilled as a straight hole to test a closed structure as mapped by seismograph data. The Wilcox, Eutaw, and Tuscaloosa formations were considered more favorable for accumulation of oil and gas. The original hole was drilled to a total depth of 4,400 ft. with 16-in. conductor pipe set at 170 ft. and 10¾-in. surface casing set at 1,813 ft.

Several zones were cored while this hole was being drilled. At the total depth of 4,400 ft. salt was encountered. A Schlumberger survey was run and 36 side-wall cores taken; however, none of the zones showed oil or gas in sufficient quantity for further testing.

It was believed that the sands lacked sufficient permeability and oil saturation for the production of oil and it was decided to plug the well and directionally drill in a westerly direction to encounter the tight shaly sands higher on the structure which occurred in the original hole at 4,090-98 ft. and 4,237-52 ft. and to test other sands which might be productive higher on the structure. The California Co. desired to deflect the well as far as safety would permit. If possible, it was desired to have a horizontal displacement of 1,300 ft. due west at 4,050 ft. true vertical depth, and not to exceed 1,650 ft. horizontally at the bottom of the hole. An 85-sack cement plug was set at 2,350 ft. to 2,205 ft. Time was allowed for the initial set of this plug, the top was smoothed off, and a second plug containing 65 sacks of cement was spotted from 2,205 to 2,025 ft. Deflection was started from this cement

*The Livingston-Shrader Co., Liberty, Tex.

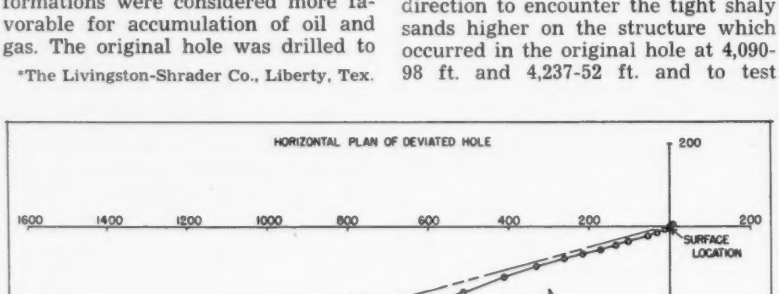


Fig. 2

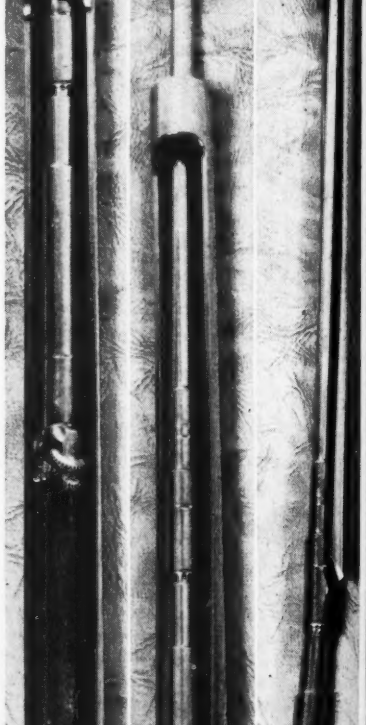


Fig. 3—(Left) Position of tool going in the hole with the shear pin attached to the drill pipe. (Center) Shear pin has sheared and operator is drilling off the face of the knuckle guide. (Right) Drilling below the knuckle guide. Note the 4° knuckle action of the lower part of the tool

plug in original hole at 2,085 ft., using a Livingston-Shrader knuckle guide. A continuous gradual increase in drift was accomplished from this tool setting to 4,047 ft., where the angle had been built up to 48° by use of varied drilling hookups.

Between 4,047 and 4,210 ft. several knuckle guides were run to change the course of the hole. At 4,210 ft. the highest angle needed had been reached, which was 51°. From this point to the total depth of 4,875 ft. the hole was allowed to lose angle gradually and at total depth the drift angle was 32½°.

At 4,558 ft., driller's depth, or 4,051 ft. true vertical depth, an electric log survey was run. Thirty-one hundred feet of open-end drill pipe was run in the well, the electric-log equipment was lowered through the drill pipe and on into the open hole below, where the electrical record was made from 3,100 to 4,558 ft. After the logging equipment and drill pipe were removed from the well, the upper part of the hole was then logged. This manner of logging was used in order to reduce the possibility of sticking or losing the electric cable in the hole. When total depth had been reached this operation was repeated and an electric survey was made of the remainder of the hole in the same manner.

Well Bottomed in Salt

From 4,723 to 4,876 ft. conventional cores were cut and showed that the well was bottomed in salt. In order to keep the hole in good condition wall reamers were used in the drilling string continuously to keep the hole from keyseating. Before running electric-log surveys a special trip was made with a pilot bit on bottom and wall reamers in the string to further eliminate keyseating. Thirty-seven single-shot surveys were run in addition to the two logging surveys. Single shots were run in open hole on a core line. In each case the single shot went to bottom freely and removed freely.

Eighty round trips were made from the sidetracking point until the well reached total depth. Of these trips, 21 were made with conventional core barrels, 7 trips running deflection tools, and 7 trips reaming rat holes. The remainder were routine trips to change bits, special reaming trips to avoid keyseating, conditioning mud, and to run electric log.

A surprisingly small amount of drag on the drill pipe was noticed while pulling out of the hole, notwithstanding the high angle of the hole. Fig. 1 summarizes the distribution of drilling time. Fig. 2 is a horizontal plan of the deflected hole, which includes some of the more pertinent information.

Directional-drilling engineer on this unusual job was A. B. Philliber, of Livingston-Shrader.

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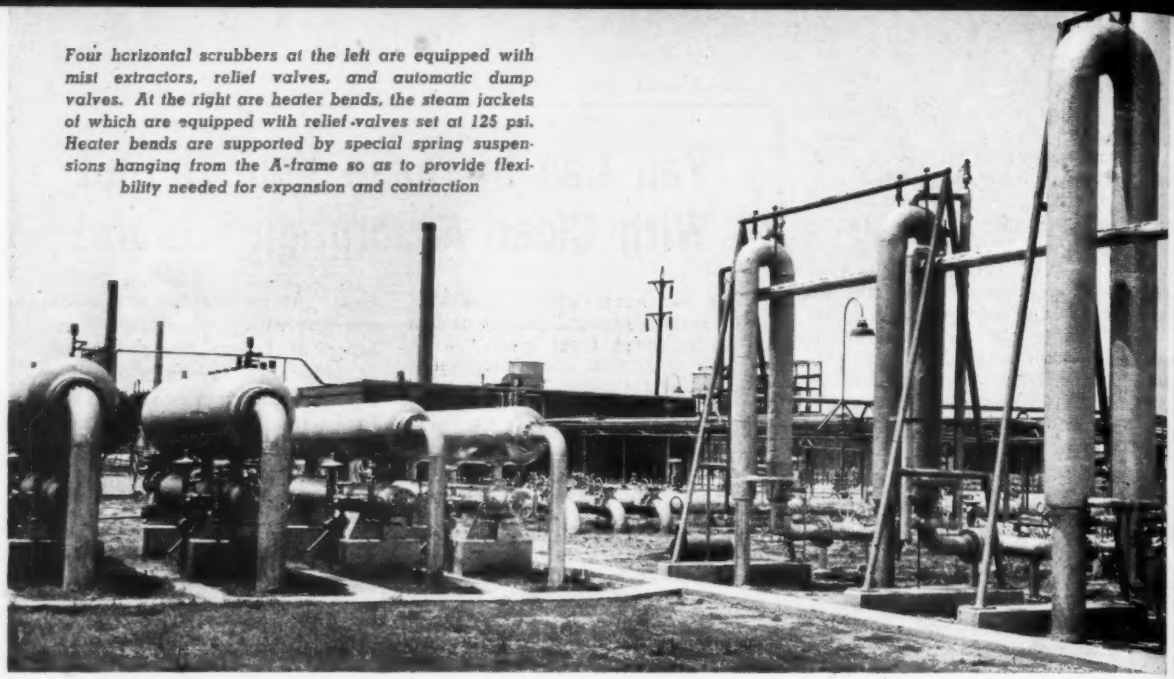


Four horizontal scrubbers at the left are equipped with mist extractors, relief valves, and automatic dump valves. At the right are heater bends, the steam jackets of which are equipped with relief-valves set at 125 psi. Heater bends are supported by special spring suspensions hanging from the A-frame so as to provide flexibility needed for expansion and contraction

Pan American's New Gas Regulating Terminal Has 200,000 M.c.f. Capacity

by O. W. Fowler*

PAN AMERICAN GAS CO. purchases natural gas from Chocolate Bayou field, Brazoria County, and the Dickinson-Gillock area, Galveston County. This natural gas now is transported through a recently completed 16-in. line from Chocolate Bayou field and two 6-in. lines from the Dickinson-Gillock area, to Texas City where it is distributed to various customers, the principal ones being Pan American Refining Corp., Carbide & Carbon Chemicals Corp., Tin Processing Corp., Republic Oil Refining Co., and Stone Oil Co.

In order to handle the expanding gas requirements of the Carbide & Carbon Chemicals Corp. plant and other industries at Texas City, Pan American Gas Co. designed and constructed a new terminal with a daily capacity of 200,000 M.c.f. to better serve the requirements of its Texas City customers.

Terminal Inlet Control Meter Runs

There are four inlet runs. The Chocolate Bayou flow is divided into two 12-in. inlet runs, each with a daily capacity of 75,000 M.c.f. and the two Dickinson-Gillock inlet runs are each designed to handle 40,000 M.c.f. daily, all at 600 psig. Each run has an inlet horizontal scrubber, heater bend, pressure-reducing regulator, downstream scrubber, meter run, flow controller, and pressure-relief valves. The scrubbers have mist extractors and the inlet scrubber is equipped with a relief valve and automatic dump valve.

The temperature of the gas below the pressure-reducing regulators is thermostatically controlled by temperature regulators which regulate the steam to the heater bends. The heater-bend steam jackets are equipped with relief valves to prevent gas from entering the plant steam lines in the event of a gas leak in one of the heater bends. Each of the Chocolate Bayou inlet-meter runs has a 4-in. relief valve and the Dickinson-Gillock meter runs each have 3-in. relief valves which empty into a 6-in. vent line.

The pressure on each of the inlet scrubbers and below the flow-control valves on each run is indicated by gage. The pressure-reducing regulators and flow-control valves are controlled by instruments, and the flow from each run is recorded mechanically. The temperature from each run, the specific gravity, and calorific value of the Chocolate Bayou gas are recorded. Any one of the inlet field lines can be bypassed ahead of the scrubbers into the other runs. The flow controllers on the inlet field runs are to enable Pan American Gas Co. terminal operators to take a constant steady flow from any given field.

Carbide Meter Runs

The header at the end of the field inlet runs delivers 600-lb. wet natural gas to Carbide through a 16-in. meter run. The pressures are indicated and the flows, temperatures, specific gravities, and B.t.u. values recorded from each of the three Carbide meter runs. There is a maximum and minimum pressure switch on the 600-psig. Carbide meter run which is connected to an alarm horn. The alarm horn is to warn the terminal operator that the pressure on this delivery line is getting too high or too low. Carbide returns a portion of the gas at 250 psig. and another larger portion at 100 psig. to be delivered to the other Pan American Gas Co. customers at Texas City.

Other Meter Runs and Equipment

There are six sales-meter runs in the gas regulating terminal for other plants at Texas City. The pressures are indicated and flows and temperatures recorded from each of these.

*Superintendent, South Central Texas division, Pan American Gas Co., Texas City, Tex.

The Pan American Refining Corp. 100-psig. meter runs have a minimum alarm switch that warns the terminal operator when the pressure is getting low.

Ahead of the Carbide header on the field inlet runs is a header for the emergency regulator stations. These stations are set to come on automatically in case Carbide does not return sufficient gas to maintain the delivery pressure to Pan American Gas Co.'s other customers.

These pressure-reducing regulators are also instrument controlled from the central control room. Each station has a scrubber and 4-in. relief valve downstream from the regulators. These relief valves also afford relief for the Carbide return-meter runs and other sales-meter runs.

All liquids from the scrubbers are dumped into a flash tank which has from 5 to 20 psig. pressure on it. Vapors from the flash tank go to Pan American Refining Corp. where they are compressed and used.

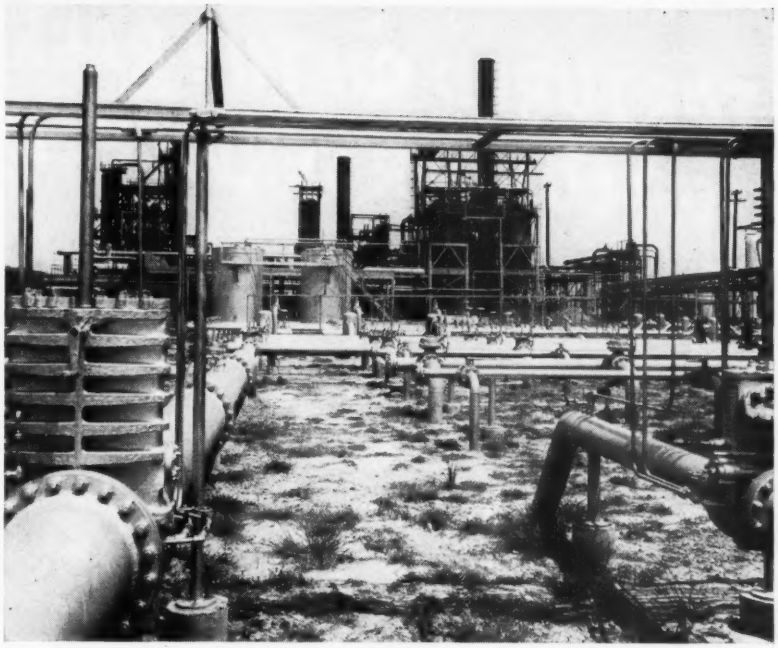
The liquids are dumped from the flash tank into storage tanks and the water from the storage tanks bled into the Pan American Refining Corp. sewerage system. This water is from the hydrates in solution in the wet gas received by Pan American Gas Co. in the field. Any one of the meter runs or lines can be bled down and vented away from the plant area. Steam for the heater bends and the office building is obtained from Pan American Refining Corp.

Control Room

The control room is unusual, in that from there it is possible for the operator to control the flow or pressure on any of the field inlet or sales-meter runs. All the instruments are operated by dry air with dry gas as a standby to come on automatically in case the air supply fails. There is a flow diagram in the control room that shows all the valves and these valves in turn are tagged with red or green disks according to whether they are open or closed at that particular time.

The atmospheric temperature and the temperature of the gas flowing in each of the four inlet-meter runs and nine sales-meter runs are recorded and the flow for the 13 meter runs is automatically recorded in the control room. There are indicating pressure gages in the control room for the inlet scrubber pressures, inlet meter-run pressures, steam-supply pressure, air-supply pressure, flash-tank pressure, and the pressures on each of the sales-meter runs.

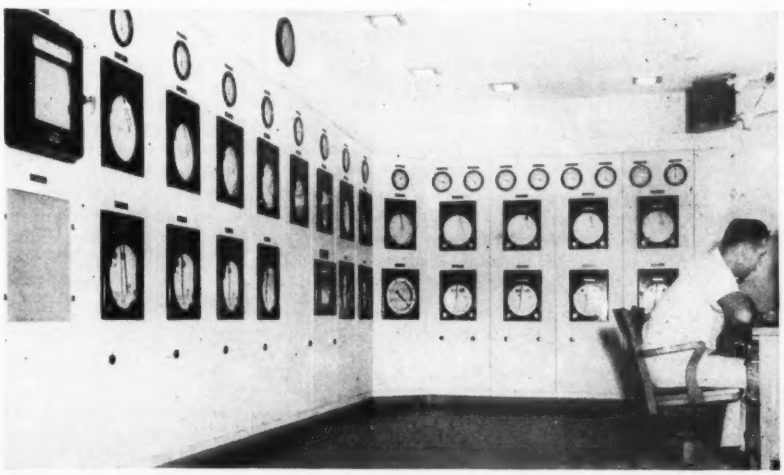
The calorific value and specific gravity of the Chocolate Bayou gas, the 600-lb. gas to Carbide, and the 100 and 250-lb. return gases from Carbide are recorded in the control room. All flows and readings are recorded hourly by the terminal operator on a daily log sheet. The terminal operator can check his operations by checking the inlet flows against the sales flow.



View of gas terminal manifold of Pan American Gas Co., Texas City, Tex., looking toward Pan American Refining Corp. plant in the background. The two aluminum-painted storage tanks at the rear hold liquids received from flash tank until they are pumped to the Pan American refinery

Each of the terminal inlet meter-run flows is checked at frequent intervals against the field deliveries, which enables the operator to note promptly any irregularities that may develop in the gas measurements. High-pressure reducing regulators are used at various wells in both Chocolate Bayou field and the Dickinson-Gillock area to meet fluctuations in the load demand. If the demand at the Texas City gas-regulating terminal increases at the rate of 10,000 M.c.f. daily within an hour, this is reflected in the field by a reduction in the main-line pressure, and the field regulators on standby service automatically open to supply the increased load demand.

Pan American has a private telephone system that connects the offices in the fields, from which gas is received, with the Texas City gas-regulating terminal.



Pressures, flows, temperatures, densities, and calorific values are recorded in the control room. At the control room, the operator can regulate movements of gas through any of the field runs or the sale runs. Instruments are operated by dry air. For standby purposes, dry gas becomes immediately available for instrument operation through the functioning of automatic equipment

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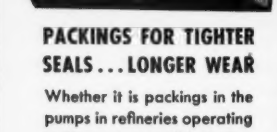

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pH Control Through Use Of a Sulfur Burner

Elimination of scale and prevention of delignification in cooling towers and similar equipment

by R. C. Ulmer and J. F. Churchill†*

Millions of dollars are spent yearly in cleaning and replacing equipment in cooling-water systems. In addition, owing to decreased heat transfer in the case of "dirty" equipment there are further losses either in efficiency or capacity amounting to still greater sums. Fortunately, in recent years a better understanding has been reached regarding these problems and improvements are possible. It is the purpose of this paper to review this information.

IN discussing cooling-water problems reference is made to any case where water is circulated through or over equipment to absorb or carry away heat. Cooling-water systems can be classified as (1) Once-through systems, (2) open circulation systems, and (3) closed circulating systems. The names pretty much indicate the difference between the systems.

The problems involved, fortunately, are about the same for all three systems and are as follows:

1. Scale and deposit formation.—Whenever water is heated or concentrated there is a tendency for materials to come out of solution or precipitate. The materials that precipitate may come out of solution on heating surfaces forming scale or some of the precipitated material suspended in the solution may deposit on the heating surfaces. In either case, decreased heat-transfer rate occurs and therefore lower efficiency results. This is probably the most important problem encountered in such systems.

The chief material that precipitates when water is heated or concentrated is calcium carbonate ($CaCO_3$). Some difficulty is also encountered from the precipitation of iron oxide (Fe_2O_3). Both materials result from constituents that are normally soluble in the water. Whether difficulty will be encountered from the precipitation of these materials depends greatly on the pH of the solution. Most of the corrective measures for the prevention of scale and deposit in cooling-water systems center around the elimination of the precipitation of these materials or upon the prevention of adherence of any of the materials that precipitate.

2. Corrosion.—Since most waters contain dissolved oxygen and carbon dioxide, both of which have a tendency to cause corrosion, this problem, often encountered, is discussed later in greater detail. The problem of corrosion is usually combated by proper pH adjustment.

3. Algea and slime.—This problem is so well known that it requires no explanation. Needless to say, during the "growing season" formation of such growths becomes a real nuisance and large losses result from decreased efficiency and capacity.

4. Delignification.—This is an apparent rotting of wood, the lignin and cellulose products being extracted leaving the wood in a stringy mass having little if any strength. This difficulty is caused almost entirely by the action of alkali on the wood. Proper control of the alkalinity or pH therefore is the chief means used to combat the problem.

The chief factors that affect scale or deposit formation are temperature, rate of heat transfer, calcium, mag-

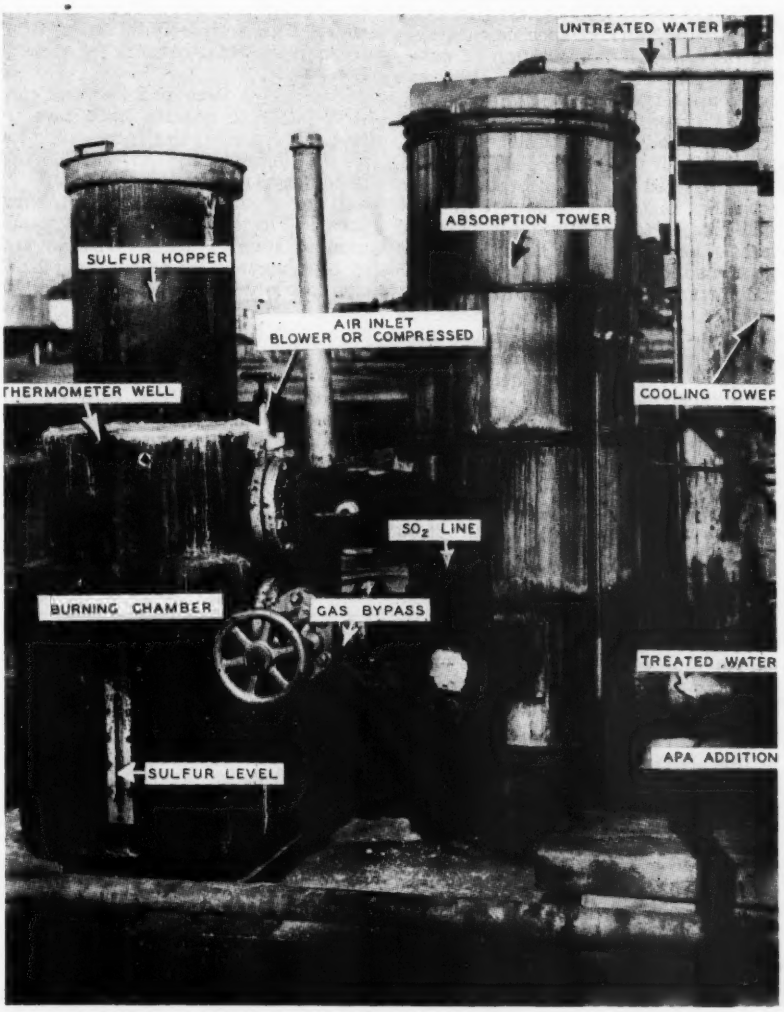

Fig. 1—Typical setup for sulfur burner—A.P.A. treatment of cooling water

*Technical director and †West Coast divisional manager, power chemicals division, E. F. Drew & Co., Inc., New York. Paper presented at C.N.G.A. meeting, Los Angeles, September 2, 1948.

nesium, silica, sulfate, and alkalinity concentrations, and especially pH value. Considerable work has been carried out to relate these factors to the problems encountered. By means of Langelier's equations, which take into consideration pH, calcium, total alkalinity, dissolved solids, and temperature it is possible to predict with some degree of accuracy whether a water is scale forming or corrosive. The Langelier index is well known in this respect. The basis of the index is whether or not water is saturated with calcium carbonate. If it is, there of course is danger of deposit formation. If it is not, there is little danger of deposit formation, but there is danger of corrosion.

Some success has been experienced through the use of this index, but unfortunately its determination and calculation are rather involved which eliminates its use as a field method. Also, it is very difficult to adjust the condition of water so that it is just nonscale forming and at the same time not corrosive. For this reason other procedures have been used.

By far the most emphasis has been placed on the use of specific chemicals to prevent the precipitation of materials from the water. The chemicals used are largely of the complex phosphate type. None are 100 per cent efficient and some deposits will form, especially if the pH exceeds 8.0 to 8.5. This has led to the incorporation of organic materials along with the phosphates to condition the material that does precipitate so as to make it nonadherent. Again it should be noted that the success of this method depends largely on pH control. In other words, the system is effective only if pH is below the range given. Sulfuric acid and other acidic materials have been used to some extent in an effort to control pH, but their usage has not been generally accepted owing either to hazards involved or to cost.

These chemicals also are advocated to eliminate corrosion if the pH is so low that corrosion will take place, for example, below 7.5. Needless to say, such a low pH in the cooling water itself is seldom encountered.

With respect to delignification, little attention has been given to this problem until recently. Fortunately, as discussed later, the remedy is very simple.

Recommended Corrective Means

A consideration of the shortcomings of the previous corrective means referred to, together with the results of investigative research, has led to the adoption of the use of an effective antiprecipitating agent in conjunction with a sulfur burner to control pH for the elimination of cooling-water problems. A photograph of the essential equipment involved is shown in Fig. 1, and Fig. 2 shows a line diagram of a typical installation.

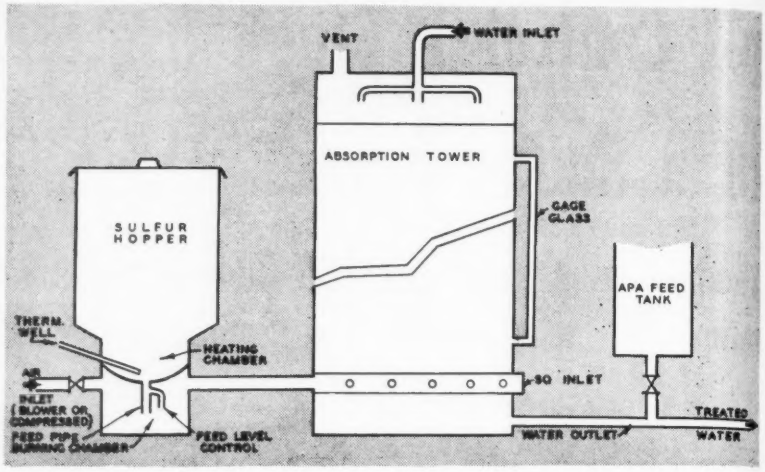

Fig. 2—Equipment diagram of sulfur burner—A.P.A. system for treatment of water to prevent scale and/or lower the alkalinity

In Fig. 2 it will be noted that the essential equipment consists of a sulfur burner for forming sulfur dioxide and an absorption tower for absorbing the sulfur dioxide in the cooling water. The antiprecipitating agent is fed into the effluent from the absorption tower.

The burner is so designed and constructed as to require little care. In fact, once the burner is in operation all that is necessary is to fill the sulfur hopper once a day or so and to adjust the air supply. Either a compressed-air line or a blower can be used to supply the air. The amount of air passed through the burner chamber governs the amount of sulfur burned and consequently the amount of alkalinity reduction. The leveling of sulfur in the burner chamber is automatic, all that is necessary being to adjust the gas flow through and around the hopper so as to maintain the molten sulfur in a certain temperature range. A bypass valve is provided for this purpose.

The gas passes from the burner to the absorption tower. A part or all of the water from the heat transfer equipment may be passed through the tower. The tower will handle 100 gal. per minute satisfactorily. This makes possible treating very large volumes of water, for example such as involved in large cooling towers or in large boiler plants since only a small fraction need be passed through the burner-tower combination.

The burners are currently available in three sizes. The large one will burn 3 to 15 lb. of sulfur per hour; the medium size one 1 to 5 lb. of sulfur per hour, and the small one 0.2 to 1 lb. of sulfur per hour. On the basis of sulfuric acid this corresponds in the case of the larger burner to the use of 12.4 to 46.5 lb. of sulfuric acid per hour; the medium-sized burner to the use of 3.1 to 15.5 lb. of sulfuric acid, and in the case of the small burner to the use of 0.62 to 3.1 lb. of sulfuric acid per hour. Larger burners can be supplied or several of the large size can be used in case more capacity is required.

Chemical Reactions Used

From a chemical standpoint, in the burner the sulfur is burned to sulfur dioxide

$$\underset{\text{Sulfur oxygen}}{S + O_2} \rightarrow \underset{\text{Sulfur dioxide}}{SO_2}$$

The sulfur dioxide dissolves in the water in the absorption tower forming sulfurous acid

$$\underset{\text{Sulfur dioxide water}}{SO_2 + H_2O} \rightarrow \underset{\text{Sulfurous acid}}{H_2SO_3}$$

The sulfurous acid formed reacts with any alkalinity present, for example sodium bicarbonate or calcium bicarbonate, neutralizing it

$$\underset{\text{Sodium bicarbonate}}{2NaHCO_3} + \underset{\text{Sulfurous acid}}{H_2SO_3} \rightarrow \underset{\text{Sodium sulfite}}{Na_2SO_3} + \underset{\text{Water}}{2H_2O} + \underset{\text{Carbon dioxide}}{2CO_2}$$

In reducing alkalinity 0.32 p.p.m. of sulfur when burned will neutralize 1 p.p.m. of alkalinity expressed as calcium carbonate. Consequently, 0.32 lb. of sulfur will be required for each p.p.m. of alkalinity reduction desired for each 1,000,000 lb. of water involved. Expressed on the basis of 1,000 gal., this amounts to 0.0027 lb. of sulfur per p.p.m. alkalinity reduction desired per 1,000 gal. of water involved.

Approximately 3.1 times by weight as much sulfuric acid as sulfur is required for alkalinity reduction. Currently sulfur costs about 0.9 cent per pound and sulfuric acid about 1.6 cents per pound. Consequently 0.9 cent worth of sulfur will reduce as much alkalinity as 4.9 cents worth of

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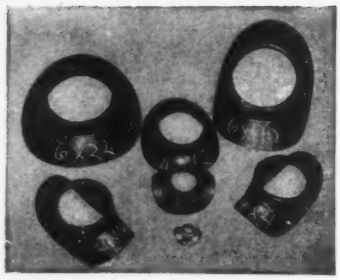

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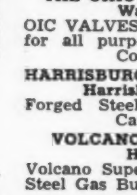

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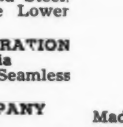

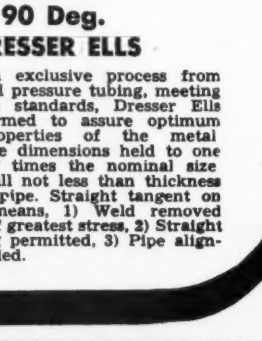

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sulfuric acid. On a million-pound-of-water basis, following are the pertinent data on the relative costs per p.p.m. reduction:

	Sulfuric acid	Sulfur
Lb./p.p.m. reduction/1,000,000 lb. H_2O	0.99	0.32
Cost cents/p.p.m. reduction/1,000,000 lb. H_2O	1.6	0.29

Consequently, it is obvious that in addition to being more convenient and safe to use, sulfur through the use of the sulfur burner is much cheaper than sulfruric acid for alkalinity reduction. Thus pH control is possible and practical and when the burner is used in conjunction with a proper antiprecipitating agent, scale and deposit formation and corrosion will be eliminated. It should be noted that through the use of the sulfur burner proper pH control is made possible without the hazards and high costs normally involved in previously used methods.

As to algea and slime control, in general fairly satisfactory results have been obtained with materials currently available. The chief materials being used are chlorine and compounds based on chlorine, phenates, or compounds based on phenol, copper sulfate, and more recently bromine, and complex ammonium compounds. In some cases the organisms build up a tolerance to any one of the materials listed, in which case it may be necessary to switch to one of the others for a short period.

As mentioned previously delignification of wood is eliminated and prevented through the control of pH with the sulfur burner. A pH of 8.0 to 8.5, which is necessary in any case for scale prevention, insures little if any attack on the wood.

Operating Data

Following are typical data for plants operating with the sulfur burner. Plant A is in the California area and Plant B in the Texas area.

PLANT A

	Make-up	Main tower*	Main tower†
pH	7.6	8.0	7.5
Phenol-alkalinity ($CaCO_3$)	0	0	0
Total alkalinity ($CaCO_3$)	260	350	99
Hydrate alkalinity ($CaCO_3$)	0	0	0
Total hardness ($CaCO_3$)	499	1,950	1,150
Chlorides (Cl)	49	208	103
Sulfates (SO_4)	531	2,400	1,408
Silica (SiO_2)	19	70	43
Phosphate (PO_4)	0	4	5

Note: Results are in p.p.m.
*Operating as single unit. †Operating with some tower water used as makeup for five other towers.

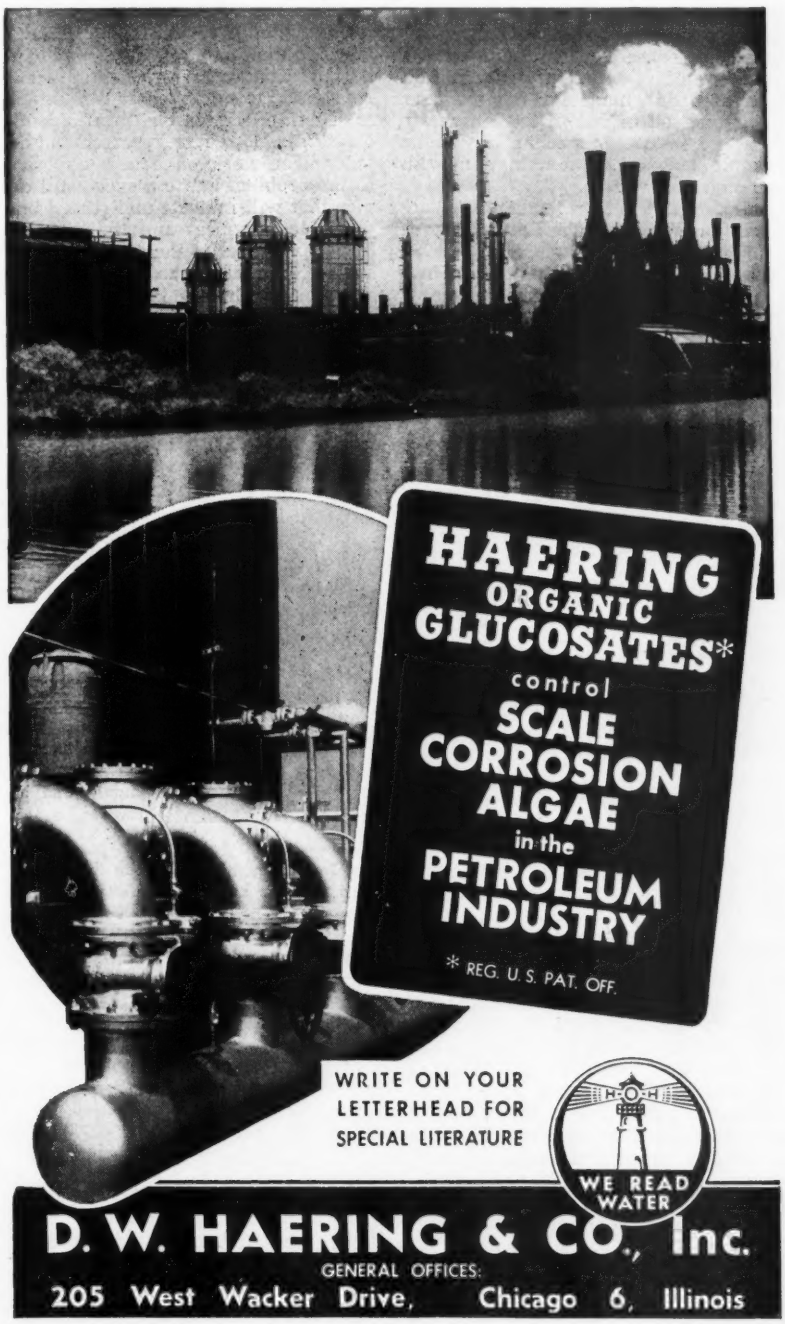
PLANT B

	RAW	Main tower basin
pH	7.8	8.2
Phenol-alkalinity ($CaCO_3$)	0	0
Total alkalinity ($CaCO_3$)	190	200-300
Total hardness ($CaCO_3$)	105	700-800
Chloride (Cl)	33	120-180
Sulfate (SO_4)	8	540-750

Note: Results are in p.p.m.

In the case of Plant A before the use of the sulfur burner, practically every type of treatment was tried but bad scaling occurred because of the high pH. After starting use of the sulfur burner in conjunction with antiprecipitation treatment, the old scale gradually disappeared and no new scale was formed. Also, no corrosion or algae has been experienced.

About the same operating conditions were experienced at Plant B. Before the use of the sulfur burner design terminal temperature differences of 5.0° F. were exceeded values of 16° to 24° F. being common. This condition would often occur in 60 days. Since this tower supplied cooling water for condensers on turbines it is obvious that a serious decrease in efficiency and capacity resulted. With the burner, in general, design conditions are maintained although values as high as 8° F. sometimes occur.



W. C. ERWIN

Surface Recording of Bottom-Hole Pressures

by W. C. Erwin*

SHORTLY after the advent of the modern packer-type tester, the need for a pressure recorder that would indicate bottom-hole pressures and the differential of pressures was realized; consequently, there were a number of so-called pressure bombs invented and made for this purpose. They ranged in design from intricate and complicated mechanisms to a simple bellows in combination with an Ingersoll watch.

Standard Oil Development Co. acquired a United States Letters Patent on the use of a bottom-hole-pressure recording device. This patent did not pertain to any particular design of the pressure bomb, but did clearly set forth and specifically cover the use of a pressure-recording instrument below a packer for the purpose of recording pressures and the differential of pressures. Licenses were granted to two drill-stem-test service companies giving them the exclusive right to use the S.O.D.C. invention. While other service concerns desired to enter the "pressure test" business and had good testing tools, they were unable to provide a pressure bomb; consequently, they were unable to do a sufficient amount of testing to make it worth while. This is particularly true in California. The oil companies request that a pressure bomb be used when testing and the Division of Oil and Gas practically demands that a bomb be used.

The company with which the writer is associated was in the latter category and although it had a pioneer design of a combination gun perforator and casing tester, it was unable to operate the tester profitably in California. However, research and development work on a new approach to the problem led to a successful device that will indicate and record bottom-hole pressures and the differential of pressures at the surface. At the surface, of course, one can readily observe each change in pressure and each phase of a test throughout its

*General manager of western division operations, McCullough Tool Co. Paper presented September 17 at Los Angeles Basin chapter, American Petroleum Institute, Long Beach.

Fig. 1—(Right) After packer is placed at the desired well depth, a sinker bar that contains an electric connection and a sampling chamber is lowered through operating string of tubing or drill pipe on a regular single conductor cable

Fig. 2—(Left) When sinker bar and connector reaches the testing tool an electric connection is made providing continuity from the gun perforator and pressure sensitive element below the testing tool, to the power supply and surface recorder

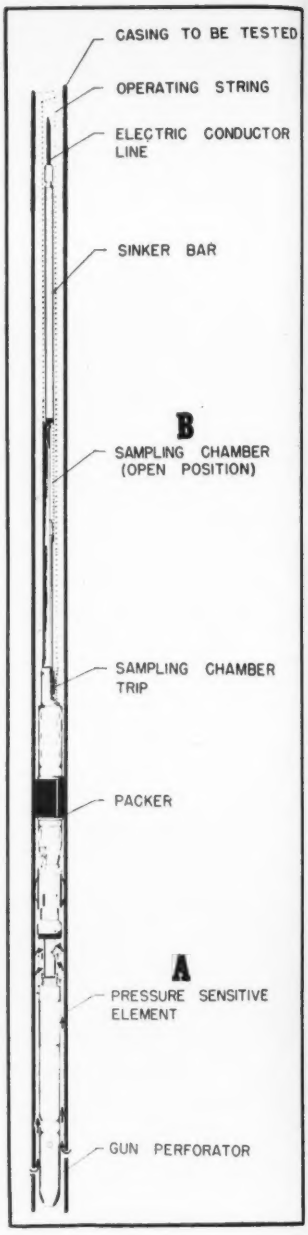
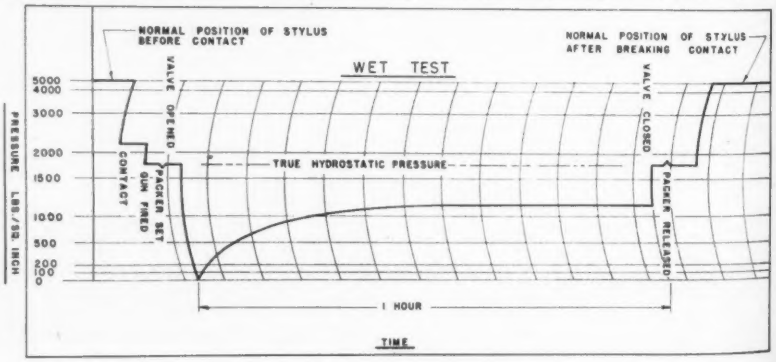


Fig. 3—(Below) When the gun is fired the information is instantly recorded on the strip chart and the needle immediately returns to the hydrostatic pressure point. If the test is wet (as shown) the curve will continue showing the increase of pressure as the fluid rises inside the operating string until the fluid head equals the formation pressure or becomes static or until the fluid flows over the top of the operating string as the case may be



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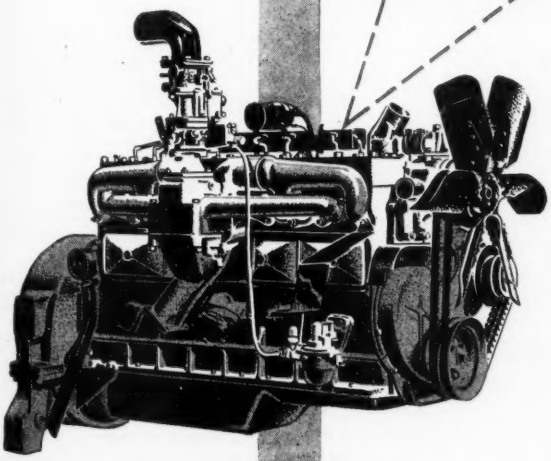

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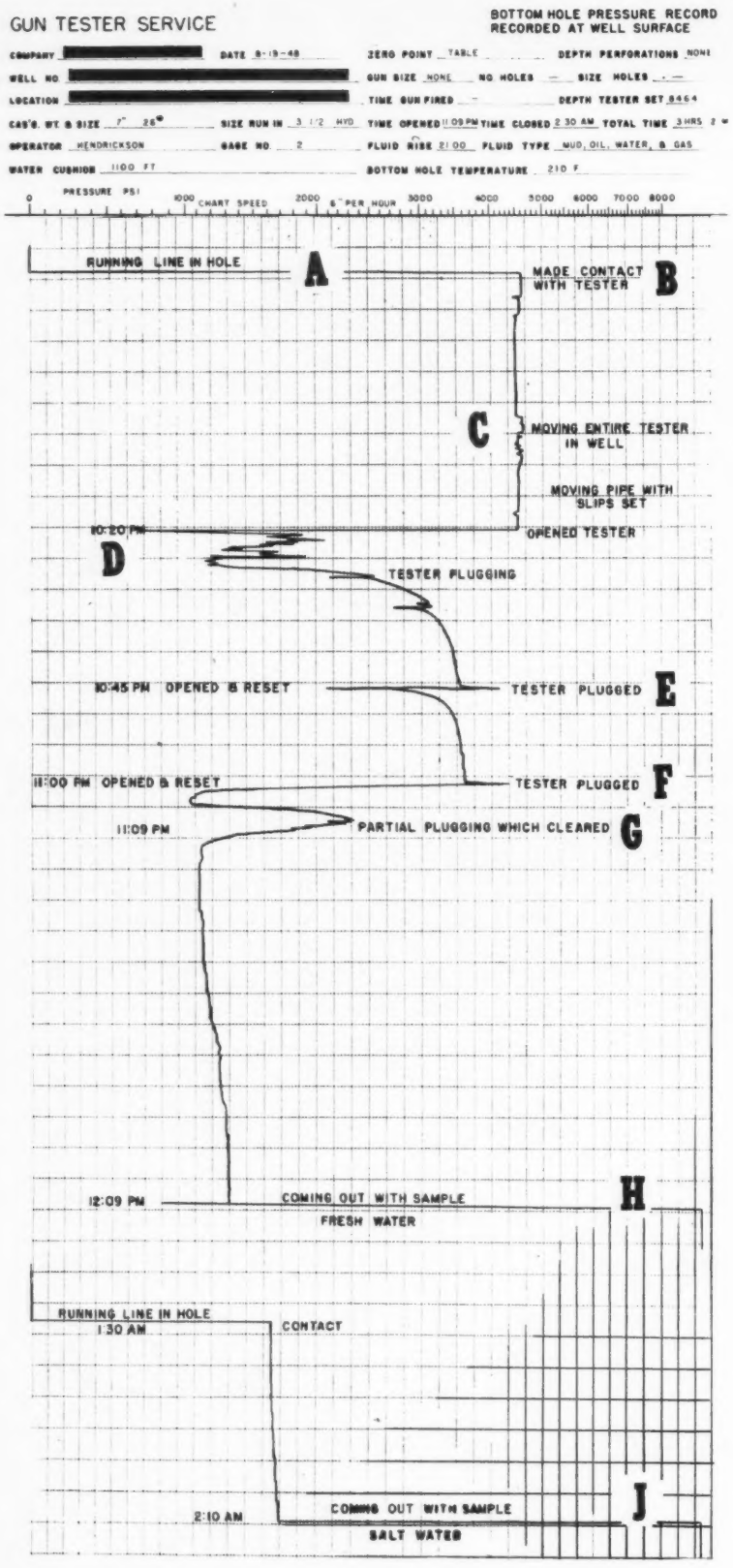

GUN TESTER SERVICE
BOTTOM HOLE PRESSURE RECORD
RECORDED AT WELL SURFACE
COMPANY [redacted] DATE 8-19-48
ZERO POINT TABLE DEPTH PERFORATIONS NONE
WELL NO. [redacted] GUN SIZE NONE NO. HOLES — SIZE HOLES —
LOCATION [redacted] TIME GUN FIRED — DEPTH TESTER SET 8464
CAS'G. WT. & SIZE 7" 26# SIZE RUN IN 3 1/2 HYD TIME OPENED 11:09 PM TIME CLOSED 2:30 AM TOTAL TIME 3 HRS 2 M
OPERATOR HENDRICKSON GAGE NO. 2 FLUID RISE 2100 FLUID TYPE MUD, OIL, WATER, & GAS
WATER CUSHION 1100 FT BOTTOM HOLE TEMPERATURE 210 F
PRESSURE PSI
CHART SPEED 6" PER HOUR
RUNNING LINE IN HOLE
A
MADE CONTACT WITH TESTER
B
C
MOVING ENTIRE TESTER IN WELL
MOVING PIPE WITH SLIPS SET
OPENED TESTER
10:20 PM
D
TESTER PLUGGING
10:45 PM OPENED & RESET
TESTER PLUGGED
E
11:00 PM OPENED & RESET
TESTER PLUGGED
F
11:09 PM
PARTIAL PLUGGING WHICH CLEARED
G
12:09 PM
COMING OUT WITH SAMPLE
FRESH WATER
H
RUNNING LINE IN HOLE
1:30 AM
CONTACT
2:10 AM
COMING OUT WITH SAMPLE
SALT WATER
J

Fig. 4—Chart made by the electrical surface recorder on a water-shutoff test. Note plugging and instant unplugging of tool. Also note two samples of fluid being taken with special sampling chamber while testing tool remains in the well

duration. The equipment is arranged as follows:

A simple pressure-sensitive element is arranged in a steel case or sub in combination with an electronic micrometer or measuring device (see "A" in Fig. 1). This assembly is arranged in combination with the gun perforator and tester so that it is at all times exposed to the well pressures.

The whole assembly, packer, gun perforator, and pressure-sensitive element is made up in a unit, and fitted to the bottom end of an operating string of tubing or drill pipe, to run into the well to point where the test is to be made. After the packer has arrived at desired depth, a sinker bar that contains an electric connection and a sampling chamber (B in Fig. 1), is lowered through the string on a regular single conductor cable. The cable is the same one used for gun perforating and other services.

When the sinker bar and connector reaches the testing tool, an electric connection is made, providing continuity from the gun perforator and pressure-sensitive element below the testing tool, to the power supply and recording device at the surface. The instant continuity is established the pressure-recording device at the surface (Fig. 2) indicates the natural hydrostatic pressure created by the fluid head in the well.

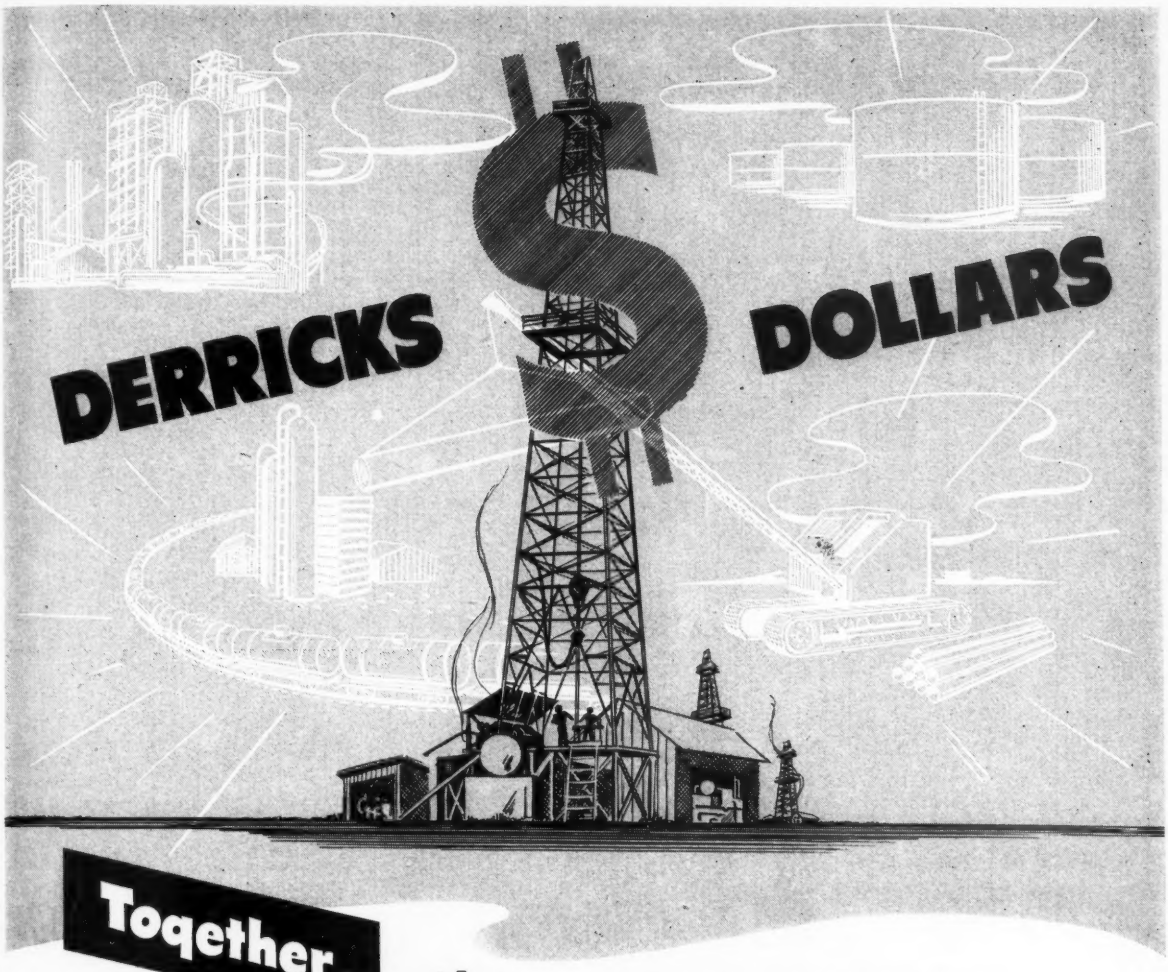
Gun Perforating Operation

The operating string is then maneuvered to place the gun perforator at the elevation at which the holes are to be shot in the casing, and the gun is fired in the usual manner. When the gun is fired the information is instantly recorded on the chart and the needle on the chart immediately returns to the hydrostatic pressure point (see Fig. 3).

Usual procedure next is to raise the packer a few feet above the shot holes where it is set, the valve in the tester opened, and the test started. When the packer is set the hydrostatic head is excluded from the pressure-sensitive element and it is exposed to the rock or formation pressure instead. The recording device at the surface then draws a curve of that pressure. If the test proves wet, the curve will continue showing the increase of pressure as the fluid rises (Fig. 3) inside of the operating string until the fluid head equals the formation pressure or becomes static, or until the fluid flows over the top of the operating string, as the case might be.

The pressure element used in this combination will detect as little as 2 or 3 lb. variation in pressure. The pressure recorder is equally sensitive and will respond instantly to the pressure variations transmitted to it by the pressure-sensitive element at the bottom of the well.

As mentioned previously, this surface-recording pressure equipment transmits information regarding all



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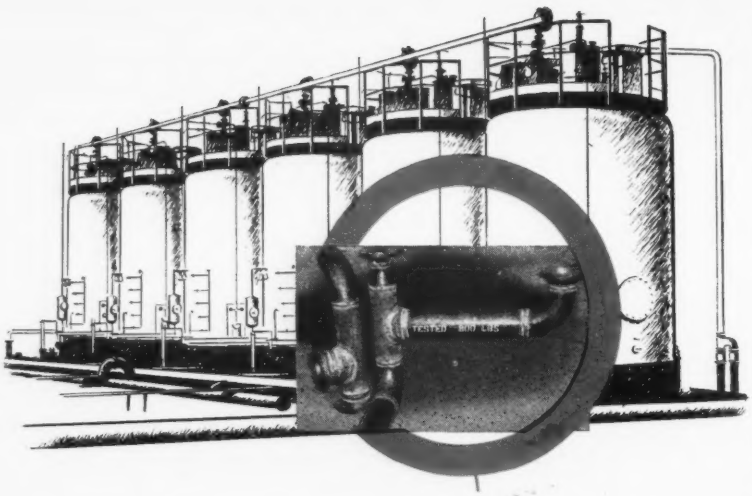
Many of the millions of dollars required by the Industry for the improvement and development of their product have come from Texas banks. The City National Bank of Houston, located in one of the Nation's greatest oil centers and actively engaged in Oil and Gas financing invites a discussion of your financing requirements. The Oil and Gas Department's broad experience in the industry . . . their knowledge of its financial requirements assures a comprehensive understanding of your problem which leads to prompt action.

THE City National BANK OF HOUSTON

MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION



SALT IS GOOD ON TOMATOES — BUT NOT IN CRUDE OIL

"Salts in crude oil are an annoying headache to refiners. They cause frequent shut-downs because of salt plugging, corrosion from evolved HCl, and the deposition of hard coke. The Petreco Electric Desalting Process, developed by the Petroleum Rectifying Company effectively eliminates the salt, with a corresponding reduction in the refining problems it causes. The Petreco Process is widely used by refiners throughout the United States, Canada, and South America.

"The Petroleum Rectifying Company has found that Bonney WeldOlets* and ThredOlets* insure strong, leak-proof pipe connections and are very effective wherever 90 degree branch connections are needed, regardless of the pipe size. Not only do WeldOlets* give the "balanced flow" which is vitally important in their multiple unit operation, but they also speed up layout, save welding time."

Eliminates costly pipe threading, provides full strength at joint and full flow

ThredOlets* make a stronger connection than couplings, and the use of both WeldOlets* and ThredOlets* gives them savings of 25% and more.

WeldOlet Fittings can be welded to pipes wherever outlets are required, eliminating costly pipe threading, reducing new construction and maintenance costs. They are safe, efficient, quickly installed.

Write today for our handbook. It may suggest ways in which WeldOlet Fittings can cut *Your* labor costs. There is a distributor in every principal city.

YOU GET 7 IMPORTANT ADVANTAGES WITH WELDOLETS*. . .

1. Full pipe strength
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4. Improved flow conditions
5. Uniform appearance
6. Reduced weight and space
7. Highest quality installation at minimum cost

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FOR WELDED BRANCH PIPE OUTLETS

When you want Bonney Welding Outlets, ask for WeldOlets*

phases of a test throughout the duration of a test. If the tester valve becomes plugged, that information is immediately indicated and recorded. This knowledge makes it possible for the operator to manipulate the tester to unplug the valve or to cause free passage again of the fluids or gas through the tester. This ability enhances the value of the surface type of pressure-recording equipment because when it is definitely known that a tester is plugged, and when it can be unplugged by simply exposing the valve to the hydrostatic head again, the test can be continued to its completion or through its predetermined period.

The chart shown in Fig. 4 was made by the surface recorder while testing a well in Seal Beach, Calif. In this instance the tester plugged three different times. An explanation of the movements of the recorder on the chart (Fig. 4) from the start will point out the indication of the plugging of the tool.

Line A was made while the sinker bar and connector was being run into the hole. Contact with the tester and pressure-sensitive element was made at point B. The waves or variation noticeable in the curve at point C were caused by the movement of the packer or the entire assembly in the well. To point out the sensitivity of the pressure-sensitive element and recorder: If the operating string and tester is moved as little as 1 ft. up or down, indication of the variance in the hydrostatic pressure is easily detected or noticed. Note the slight waves on the chart which were caused by a minute movement of the pipe after the slips of the packer had been set.

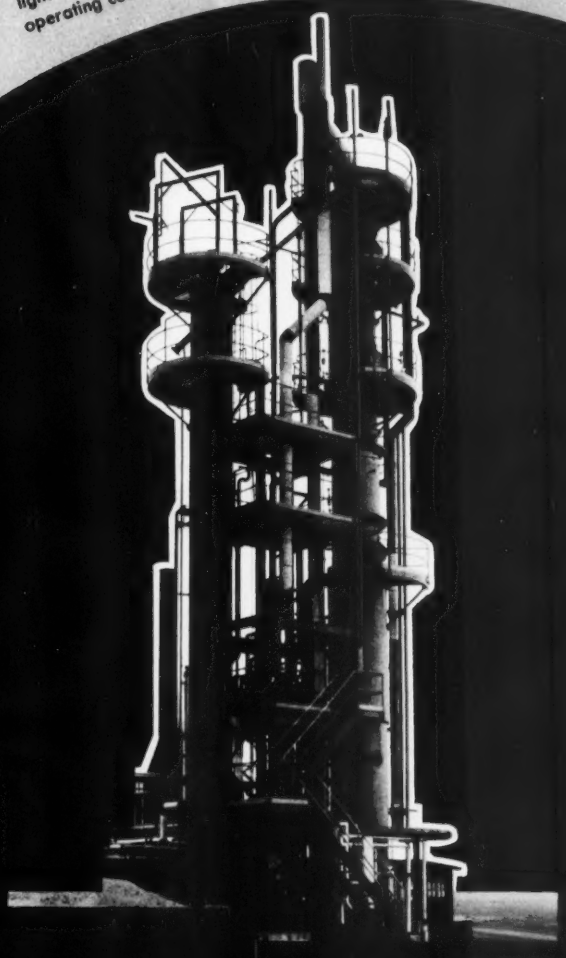
After the packer was set and the hydrostatic pressure excluded from the pressure-sensitive element, the recorded pressure immediately dropped to approximately 700 psi. (D, Fig. 4), which indicated the start of the build-up of the formation pressure. The curve gradually raises with a few variations probably caused by intermittent plugging, or entrance of pieces of shale or other material large enough to cause momentary stoppage of the free passage of fluid.

The two points E and F definitely indicate that the tester valve plugged. This information was recognized, and the tester therefore was picked up to close and reopen the valve. This resulted in successfully unplugging the tester valve. Point G indicates a partial plugging of the tool and that it cleared itself without aid. From there on the test proceeded normally with an increase of pressure to approximately 1,300 psi.

Now the sampling chamber was brought into play. At this point it was decided to take a sample of the fluid that was entering the operating string through the tester. The sinker bar was pulled loose from the contact at the top of the tester. When an upward

out of the red into the black with **hypersorption**

the most economic process for the selective separation of light gases . . . higher yields . . . lower investment and operating costs per product unit.



out of the red

This Hypersorption unit is separating Ethylene from a complex gaseous mixture containing but 5.7% Ethylene. Another unit, charging Natural Gas, is "on stream" and two more are being designed for specific gaseous separations. All of these units have been or will be designed by the Union Oil Co. and the Foster Wheeler Corporation.

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hypersorption fundamentals

research ... development

the temperature control of the tremendous adsorption surface of a moving bed of activated carbon is the basic research-development accomplishment responsible for the highly selective adsorption capacity of the Hypersorption process.

50,000 magnification of the surface of activated carbon.

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fabrication
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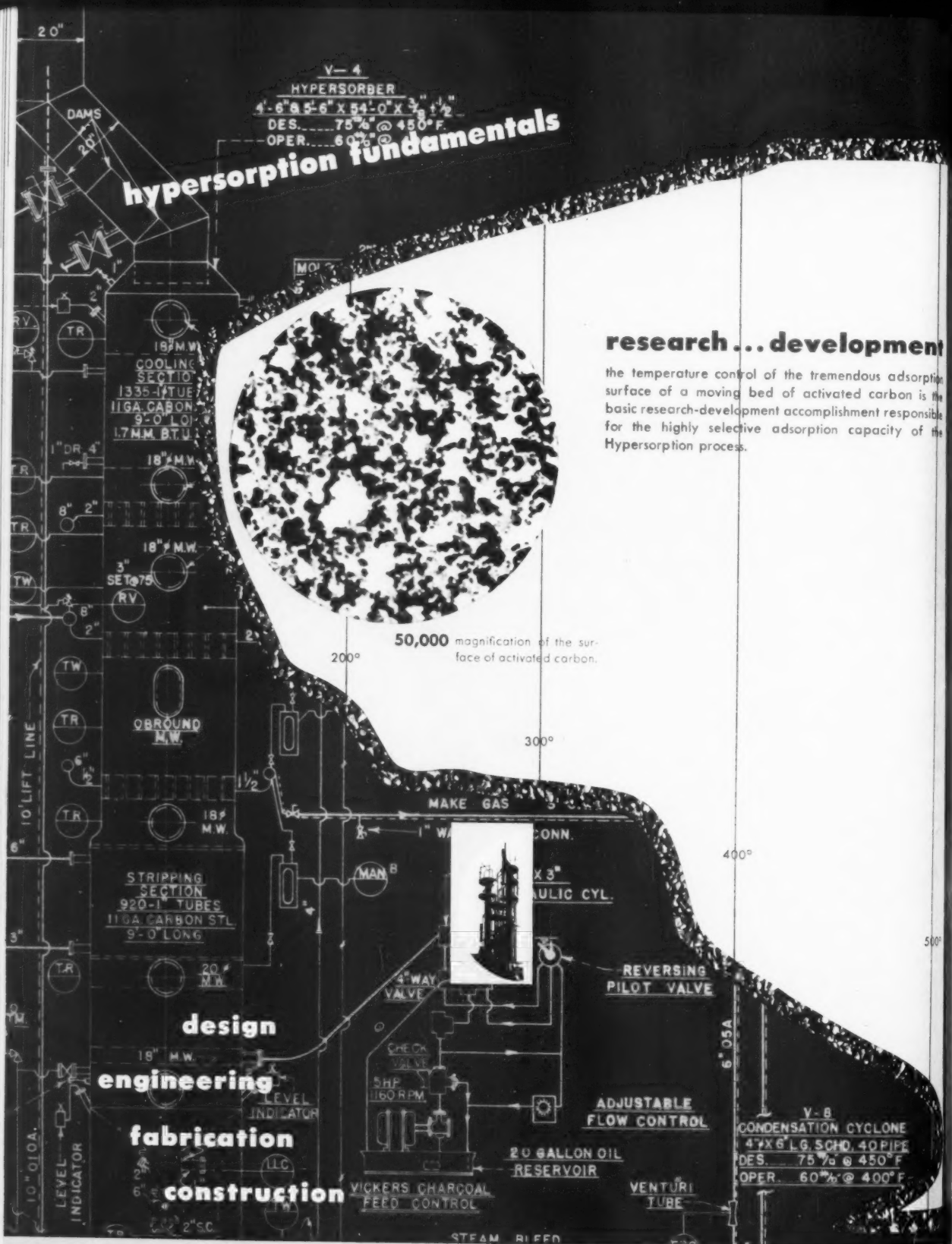

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FLOW DIAGRAM
HYPERSORBER UNIT
FOR

DRAWN BY: J.S. Logan 1-29-46 | SCALE: ¼" = 1'-0" | EST. NO. | RC-392 | DWG. NO. 392-11-P1

pull or strain is applied to the line a set of shear pins shear, allowing the telescopic sampling chamber to open and admit a quantity of fluid. Upon continued upward movement the latch that normally holds the sampling chamber down, is forced open to allow the sampling chamber to be pulled from the hole. In this case the sample proved to be fresh water and the natural assumption was that it came from the drilling fluid.

Had an ordinary tester and pressure bomb been used in this instance, the test would have been null and void because fluid entry would have stopped at the time of the plugging; knowledge that the tool was plugged would not have been available until after the tester was pulled from the well. Because the sampling chamber was available, a rerun was made for a second sample while the test continued, as indicated on the chart at point J. The second sample was salt water which indicated that even though the testing continued for 2 hours before the first sample of fresh water was obtained, it was necessary for the salt water to force the fresh water out of the formation before the salt could enter the operating string and thus indicate a wet test such as was the case in this instance.

In summary, the surface recording type of pressure bomb offers the following advantages:

1. The pressure recorder itself is at the surface where it can be observed at all times during a test.

2. It is possible to use a much larger chart than can be used in the bottom-hole type of recorder.

3. Information regarding all phases of the test is instantly recorded and can be interpreted on the spot.

4. When used in combination with a gun tester the surface-recording pressure bomb clearly indicates whether or not the gun has fired, if and when a tester plugs, and when it becomes unplugged.

5. If a well becomes wild and is apt to flow, the information is instantly recorded giving the operator good and timely warning, making it possible to take protective measures at the surface or to close the tester valve.

6. Samples of the fluid entering the operating string can be taken as often as desired, to provide added valuable information. These can help eliminate the necessity of reruns.

7. The danger of pulling wet jobs is practically eliminated because a fair estimate of the height of the fluid column in the operating string is at hand.

8. Savings in time. Information necessary for the arrangement of subsequent services is available before the tester is started out of the hole. Another time-saving feature is that quite often because of recording all phases of a test it is not necessary to allow the tester to set throughout the full time that is usually predetermined.

9. The height of fluid in the operating string can easily be determined while sampling. This is not only true of the level that the fluid entering the operating string from the formation has reached, but a check on the level of fluid that might be injected into the operating string as a cushion can also be made.

L. S. T. Conversion

(Continued from page 84)

In a center-line hold space, in the extreme bottom of the ship, complete cementing equipment is permanently installed. This equipment is especially designed for offshore-drilling operations. At the third deck level, supplies such as mud, cement, and pipe are stored. This is the tank deck which in wartime was loaded with invasion vehicles and supplies.

Comfortable Crew Quarters

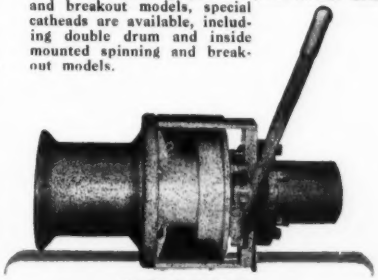
The austere troop quarters which housed combat troops en route to a landing beach, have been made more comfortable for the drilling crews. Tile floors have been installed in the galley and washrooms, and steel decking in the living quarters has been covered with magnesite—a light,

Foster Catheads. FIRST CHOICE OF THE DRILLING INDUSTRY

EASY TO OPERATE

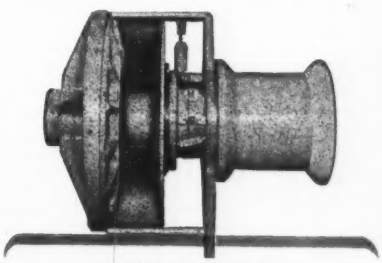
It *doesn't* take a seven foot, four hundred pound driller to operate Foster Catheads. Heavy, well lubricated bearings, friction clutches and a crowder mechanism of advanced design permit *maximum power* to be obtained with *minimum effort*. Whether they're operated by hand, foot or air controls, *Foster* Catheads do their jobs faster, safer and with less effort on the driller's part.

For *top cathead performance*, use Foster Catheads on your rigs. In addition to regular spinning and breakout models, special catheads are available, including double drum and inside mounted spinning and breakout models.



FOSTER SPINNING CATHEAD

Safer . . . hand-wrapping of spinning line is eliminated; thus also eliminating the possibility of the operator becoming entangled in the spinning line and badly injured. Drum instantly freed from contact with all moving parts when control lever is released. Therefore it stops instantly and will not crawl. New guard prevents line from getting off drum. *Faster* . . . driller operates cathead from regular position without leaving throttle; will spin and tong with forked line if desired. *Dependable* . . . heavy bearings, ample lubrication, powerful friction clutch, strong construction assure long service. *Economical* . . . minimum expense for rope and maintenance; no slow-down due to bad weather or short crew.



FOSTER BREAKOUT CATHEAD

Safer . . . slower line speeds prevent jerking of tongs. *Faster* . . . powerful friction clutch engages or disengages either instantly or gradually at the will of the operator without slowing cathead shaft. *Dependable* . . . heavy bearings, ample lubrication, powerful single plate friction clutch, heat-resistant clutch facings, high quality materials combine to make a durable cathead. *Economical* . . . designed for direct shaft mounting to reduce bending of cathead shaft; stationary sleeve mounting for drum (patented) common to both catheads, eliminates complicated brake.

SOLD THROUGH SUPPLY STORES EVERYWHERE

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Houston, Texas

resilient mineral commonly used for ships' floor. Game rooms have been provided for use by the crews in off-duty hours.

To facilitate the handling of food from storage to the kitchen, a dumb waiter has been installed. Powerful exhaust fans have been installed throughout the ship to keep the air fresh. One fan is located above each active mud tank to clear the air of gas in case the mud is gas cut. Another fan exhausts the dust created by the cutting of cement sacks during cementing operations. Still other fans have been installed to insure fresh air in the living quarters aboard ship.

Considerable revision of the ship's water system was necessary. For wartime use only one fresh-water system was provided. For offshore drilling, Humble has installed three—one for drinking, one for washing, and one to supply drilling or ballast water. Specifications of the U. S. Public Health Service have been met in the design of the water systems, although this precaution is not a legal necessity.

To provide a connection between the L.S.T. and the drilling platform, a special walkway is installed at the bow. This walkway operates on rollers and a turntable to compensate for the roll and pitch of the ship. However, most of the roll and pitch is eliminated by a system of eight chain-and-wire-line mooring lines attached to chain stoppers or large winches on the top deck. The lines are attached to seven steel pile anchors and one 10,000-lb. ship-type anchor. Tension up to 30,000 lb. is held on the lines by the winches.

The mooring system is designed to withstand winds of 100 m.p.h. on the stern plus a 5-knot current, 80 m.p.h. on the bow plus a 5-knot current and 80 m.p.h. broadside plus a 1-knot current. However, when prior warning of storms is given, the ships are moved a safe distance from the platform and anchored to ride out the storm.

An intercom system of sound-powered telephones is provided to make it possible for crew members to talk between the ship and the drilling platform. In addition, F.M. radio and radio-telephone is installed. The F.M. radio is used to communicate with Humble's land headquarters while the radio-telephone can reach any point in the United States in case of emergency.

Humble has repaired the wartime radar setup which was an organic part of the ship's equipment. It is planned to use the radar to direct crew and supply boats to the platform. In addition, the radar can direct the boats to their home base in the event the home base goes off the air for any reason.

A unique system has been devised to get crew members on and off the L.S.T. The apparatus is described as a "personnel landing ramp" and is similar to fire escapes provided to reach from the second story to ground floor level on many buildings. The personnel landing ramp consists of a free-moving gangway attached to the upper deck of the L.S.T. On the lower end of the gangway is a ladder to reach the decks of the crew boats. The ladder is equipped on the bottom end with a rubber ball. This rubber ball is designed to fit into a socket on the deck of the crew boat. Hence, a solid connection is made between the ladder and the crew boat while the crew boat is backing against a taut hawser to stay in position. This relatively safe method of loading and unloading personnel is of considerable importance. Heavy seas and high winds often make the transfer of personnel a very unsafe procedure if proper equipment is not provided.

There is sufficient space on the top deck of the ship to load substructure, draw works, prime movers, mud pump, mud tank, and all other drilling equipment which is used on the platform. Hence, it is unnecessary to hire a barge for this equipment when rigging up. The 35-ton revolving crane on the ship is used to unload this equipment on the platform.

Capacity of the ships, upon completion, is 3,400 tons of equipment and supplies, and 59 men. The ships are not self-propelled. However, the original ship's engines are still in place and available for possible future use. Tugs move the craft from the shipyards to the offshore location.

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TIME AND TOOL SAVER!
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HOT FORGED STEEL
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CAN BE APPLIED WITH EITHER A HAMMER OR WRENCH!
For all piping purposes requiring a quick opening and quick closing union, here is time and tool economy without sacrificing efficiency or dependability! Triangular shaped lug nut eliminates distortion or breaking (straight surface for hammer prevents glancing blow), gives you quick, easy application without thread crossing or sticking!
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CATAWISSA VALVE & FITTINGS COMPANY CATAWISSA, PENNA.

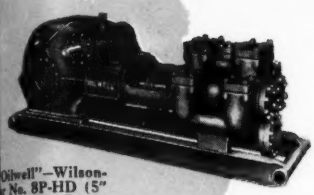
Automatic Control of Fractionating Towers

(Continued from page 89)

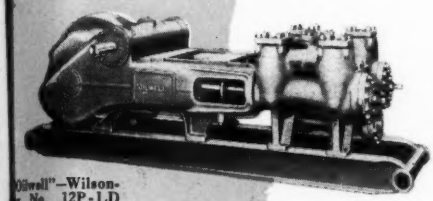
the feed to the tower is controlled from some other instrument, presumably a level controller on the preceding column. It follows naturally that if the feed rate to the fractionator is being varied, then the overhead product must vary in an exact proportion where the constituents of the material remain about the same. With this fact in mind, it becomes logical to arrange that the overhead product be changed immediately the incoming feed is changed in accordance with the easily calculated ratio which must be maintained between the two. Consequently, a flow-ratio controller is seen so arranged that it operates a control valve in the overhead product line to maintain the desired ratio between the two flows.

A flow-ratio controller between overhead and feed of itself would not be sufficient because the measurement of the two flows is not exact, and secondly, measurement of flow

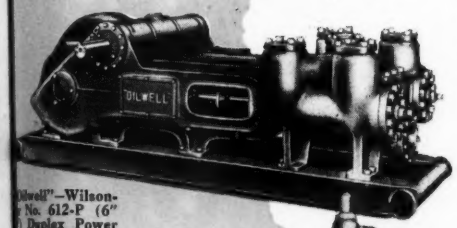
5 dependable PUMPS for portable rigs



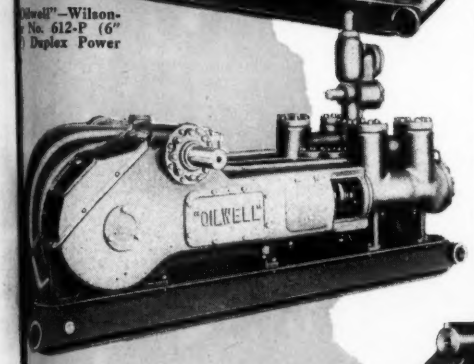
Oilwell"—Wilson-
No. 8P-HD (5"
Duplex Power



Oilwell"—Wilson-
No. 12P-LD
12") Duplex
Pump.



Oilwell"—Wilson-
No. 612-P (6"
Duplex Power



Oilwell"—Wilson-
No. 712-P (7¼"
Duplex Power

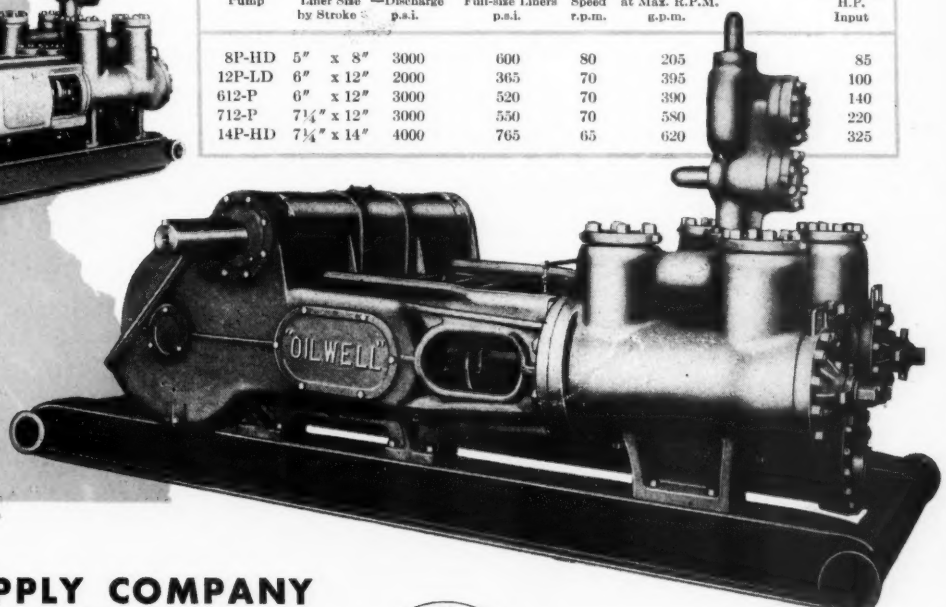
THERE is an "Oilwell"—Wilson-Snyder Duplex Power Pump of the right size and capacity for every drilling requirement. The 5 pumps illustrated are recommended for portable rigs where the drilling depths are moderate.

Outstanding advantages of these pumps include: (1) single helical gears which are reversible to compensate for wear, (2) crankshaft and pinion shaft are made of heat-treated alloy steel and mounted in adjustable tapered roller bearings, (3) large streamlined passages assure minimum restriction to mud flow and adequately large valves are provided for high speed operation, (4) bearings, pinion, main gear, and crossheads are lubricated by a combination oilbath and positive flow lubrication system, (5) crosshead-pin roller bearings, diaphragm stuffing boxes, and fluid-end stuffing boxes are pressure grease-lubricated, (6) DI-HARD fluid cylinder liners, (7) HI-HARD piston rods having A.P.I. taper, (8) alloy steel fluid valves and seats, (9) flexible mud-baffle discs, (10) all pumps are equipped with packed-off liners and (11) all pumps are mounted on a heavy-duty steel skid assembly.

A complete line of Accessories including suction strainers, valves, working tools and types of packing is available.

BRIEF SPECIFICATIONS

Pump	Max. Liner Size by Stroke	Hydrostatic Test Press. —Discharge p.s.i.	Working Press. With Full-size Liners p.s.i.	Recom. Speed r.p.m.	Theoretical Displacement at Max. R.P.M. g.p.m.	Rec. Brake H.P. Input
8P-HD	5″ x 8″	3000	600	80	205	85
12P-LD	6″ x 12″	2000	365	70	395	100
612-P	6″ x 12″	3000	520	70	390	140
712-P	7¼″ x 12″	3000	550	70	580	220
14P-HD	7¼″ x 14″	4000	765	65	620	325



The "Oilwell"—Wilson-Snyder No. 14P-HD (7¼" x 14") Duplex Power Pump.

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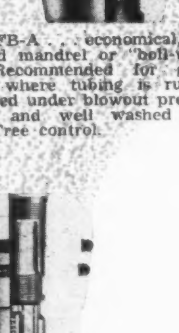
Cameron

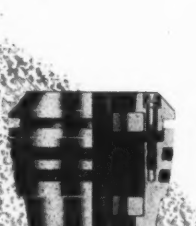
Type "F" Forged Steel Tubing Heads and Hangers

TYPE FB-A . . . economical, simple threaded mandrel or "bell-weevil" type. Recommended for general service where tubing is run and suspended under blowout preventer control and well washed under Xmas Tree control.

TYPE FB-B . . . in addition to the tubing threads, has an internal thread for receiving a back pressure valve . . . permits tubing to be run, well washed, packer set under blowout preventer control.

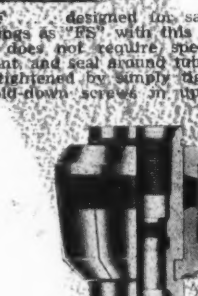


TYPE FS . . . "polish joint" type recommended for hook wall or duel zone packer settings and permits well to be washed in under Xmas Tree control . . . requires no back pressure valve.

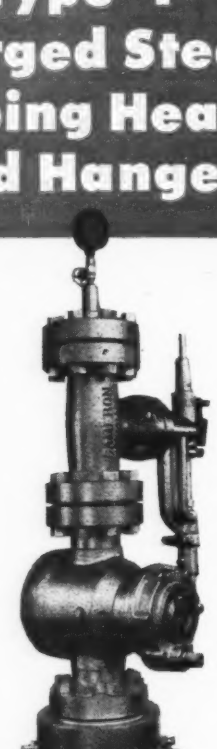


TYPE RF . . . designed for same type settings as "FS" with this advantage: does not require special polish joint and seal around tubing may be tightened by simply tightening hold-down screws in upper flange.

TYPE UF . . . designed specifically for well settings which require that tubing be run in the hole past the final tubing suspension point . . . permits running of screen and liner on bottom of tubing.



TYPE QF . . . designed for those areas where it is necessary to set a formation packer or where some other operating condition dictates use of slip suspension for tubing.



permit you to select any of these six proved types of suspension and seal

Press forged from selected alloy steel, Cameron Type "F" Tubing Heads provide the maximum in safety and service. The single Forged Steel Type "F" body is adaptable to the six types of suspension and seal described above . . . a proved lock screw design with all necessary features for successful completion of single or multi-zone wells in both low and high pressure areas.

Write for complete mechanical details or see your Composite Catalog.

CAMERON IRON WORKS, INC.

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does not recognize a change in composition. In order that the precise degree of fractionation shall always be maintained, a second instrument which measures conditions in the column is used to adjust the ratio.

The temperature-difference controller has been rejected in order to show a different means of achieving the same end. In this case the principle embodied is that if the composition of the material on a given tray in the column is maintained at established conditions, then the composition of the overhead product must also remain at established conditions.

Since we can pick a composition to be maintained on a certain tray, a sample of that material may be put in a bulb located inside the column. A pressure tap from this bulb is led to a differential pressure transmitter which compares its pressure with that of the pressure in the column. The pressure in the column is a function of the vapor pressure of the material on the tray at which the tap is taken, while the pressure in the bulb is a function of the vapor pressure of the material in the bulb and since both of these materials are at the same temperature the vapor pressures will be the same when their constituents are the same. Variations in composition of the liquid on the tray in the column will produce a difference between the vapor pressures and this difference may be used to operate a controller which adjusts the ratio between overhead make and feed.

Vapor-Pressure Transmitter

The thought of using a differential vapor-pressure transmitter for control of fractionating columns is not new to the industry but until recently mechanical difficulties have made the execution of the idea impractical. A device is illustrated in Fig. 10 which will measure the vapor pressure difference very accurately and which overcomes the mechanical problems heretofore encountered. A simple force balance system is used to measure the force exerted upon the diaphragm by the difference in the two vapor pressures and the instrument is arranged so that zero differential is read at the center of the chart where the control point is set. A pen movement upscale indicates an increase in the lighter component on the tray while a downward pen movement indicates the reverse.

This type of controller has advantage because selection of the controlled tray is not so critical as the selection of the temperature-difference points. Like the temperature-difference controller it is not upset by variations in tower pressure. Sensitivity can be as high as desired, corresponding if necessary to a full-scale span of 2° F. Furthermore, the equipment is quite simple in design and operation. (A number of commercial instruments of this type are available).

The reflux to this column is shown under flow control but this may be improved by arranging that the flow transmitter on the feed to the column reset the control point of the flow control in order that the desired reflux ratio be maintained. The decision as to whether or not to do this must lie with the column designer and will be judged on the basis of the anticipated change in the rates of feed and amount that the reflux ratio may be allowed to vary without detracting from efficient operation of the column or adding unnecessarily to the operating cost.

Acknowledgments

The writer wishes to acknowledge his indebtedness to P. Tuiningha and H. Thesingh of C.P.I.M., Curacao, for suggestions and help in trying out control systems, to W. E. Boyle of Shell Oil, Inc., and to P. Hoyt of Shell Development Corp. for their cooperation in testing equipment and to G. C. Gallagher, Fluor Corp., and G. I. Bilyeu, Foxboro Co., for many original ideas and constructive criticism.

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QUESTIONS on TECHNOLOGY

by W. L. Nelson
Consulting Engineer

Increase in Refinery Construction Costs

In the construction cost indexes published in The Oil and Gas Journal, we note the E.N.R. index and the author index follow one another closely from 1924 through 1947 but in 1948 the author index changes by 29 per cent whereas the E.N.R. index changes by only 14.5 per cent. This seems excessive to us and we would like to know if perchance it is an error?—G. H. D.

The two indexes mentioned (The Oil and Gas Journal, October 21, 1948, p. 141) do not follow closely except between the years 1937 and 1947—and in 1924 are quite different, i.e., 78 and 61. There are reasons why the two indexes should not always parallel each other. Fundamentally, the E.N.R. is based much more on labor costs than is the author refinery index. The labor charge is about double in the E.N.R. index. Note that the ENR and refinery labor indexes follow each other very closely between the years 1924 and 1942. Only in recent years (1943-1947) has the wage of refinery operators or workmen greatly exceeded the average wage of laborers. Another major difference between the two indexes is the more intricate material and equipment employed in refinery construction. The material items in a refinery index actually represent much labor. Thus, the large increase in labor costs of the last few years enters the refinery construction index both as labor and as increased material cost. This increase became particularly evident during 1947 and 1948.

Accuracy Not Possible

Obviously, the projection of an index to the present cannot be accurate. Only a few items are kept up to a current basis by the U. S. Government and other agencies. Lumber indexes (July 1948) are already 163-185 with respect to 1946, building materials are at 147 and composite steel is at 136 Lower indexes are shown by brick and tile (123), cement (122), and chemicals (119); but wages have increased sharply. These values were taken mainly from Survey of Current Business by the Bureau of Foreign and Domestic Commerce, U. S. Department of Commerce. Wages can be brought to date from the Monthly Labor Review, Bureau of Labor Statistics of the U. S. Department of Labor. Iron castings such as bubble trays have increased greatly in price. H. Bliss (Chem. Eng., May 1947, p. 126) states that such castings have increased by 300 per cent in price in the 2 years before 1947, however, he may mean since about 1941. One contractor has encountered an increase in the price of a stainless-steel bubble cap from 43 cents each in 1943 to $1.52 in 1948. There are many similar but scattered data indicating generally the great increase in labor costs (and perhaps slowdowns) during 1947-1948.

Finally, much material is still scarce, and posted prices are not always indicative of the prices being paid. The refinery construction indexes shown in the No. 1 issue of Cost-imating can only be estimates and they may be too high, but there are many indications which point to a rapid increase in refinery-construction costs. There also seem to be factors at work that tend to reduce the cost of construction during the last quarter of 1948.

Refinery Construction Indexes

In your new Cost-imating section we are particularly interested in the refinery construction index. It would be of more value to us if you would answer the following six questions about it.—C. E. P.

The Oil and Gas Journal is not sponsoring the refinery construction index. It was prepared merely to permit the approximation of construction costs for use in the Cost-imating series and to permit the conversion of costs from one year to another. The index was first used in the October 21, 1948, issue of the No. 1 Cost-imating article, and the answers to your questions were given there but perhaps not completely enough. The questions are:

1. What is percentage of labor and does it change from year to year? The over-all or author refinery index is stated in the October 21 issue to consist of 30-35 per cent labor (the refinery construction labor index). The percentage of labor obviously should change from year to year and it was used as 30 per cent until about 1934 and then was increased to 35 per cent.

2. What is the basis of the refinery labor index? It was judged from the last two labor indexes shown in the tabulation (refinery operation, and construction) in the October 21 issue, which as the footnote stated were taken from the statistical abstracts of the United States (U. S. Department of Commerce)—except when the author's own files of refinery wages, dating back to 1927, indicated great disagreement.

3. What is the source of the process index indicated as being weighted 20-22 per cent? It is the Marshall-Stevens index marked process industries with a footnote directing to R. W. Stevens, Chem. Eng. News, November 1947, p. 124.

4. What is the source of the general construction index weighted as 20-22 per cent? It is the E.N.R. index also shown in the tabulation of the October 21 issue and it is compiled by Engineering News Record.

5. What is the weighting of the items making up 5-6 per cent? The question is not clear because it was stated in the October 21 issue that a weighting of 5-6 per cent **each** was allowed for instruments, exchangers, pumps, buildings, and utilities (electrical and steam power indexes together). Indexes for all of these items are also shown in the tabulation of the October 21 issue.

6. What weight was given the Stevens index? The Stevens index of refinery construction appeared to be out of line with other sources and hence it was used only to round out the index numbers, and in a few instances to change the author index by 1 or 1½ units toward the Stevens index. After such alterations were made, the material and the labor indexes were also altered.

Examples of the elements of the author index for the years 1931, 1936, and 1942 are:

	1931	1936	1942
Labor	17.1	21.0	27.6
Process	13.4	13.4	16.2
General construction	10.8	11.6	16.0
Instruments	5.2	4.0	4.5
Exchangers	3.5	3.5	5.0
Pumps and Comp.	4.3	4.0	4.6
Buildings	3.2	2.8	4.1
Elect. and steam	3.8	3.4	3.9
Total	61.3	63.7	81.9
Author index	61.0	64.0	80.0
Stevens index	63.0	68.0	78.0

It is believed that it is academic to attempt to be highly precise in the development of an index from sources of current information that are now available. Perhaps a current index could be developed by some contracting company which continually obtains quotations. It would be impossible to project the refinery indexes used in the Cost-imating series by using the same sources upon which it was based because the Marshall-Stevens and some of the other bases used, are not currently available.

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12¾"-13⅜"	28½"

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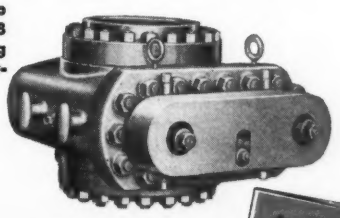

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ENGINEERING *fundamentals*

Methods of Obtaining Connate Water Saturation

METHODS of determining connate water are both direct and indirect. Some measure the amount of water directly, some measure a characteristic of the reservoir system depending upon the amount of connate water, and some attempt to duplicate the amount of water originally in place. Connate-water values have been determined on formations in place, i.e., by logging, on cores removed from the reservoir with their water content intact, and on dry cores by reproducing the initial water values.

The most direct means of measuring water content, although possibly not the most accurate, is the analysis of a core. The problem here is not one of measuring accurately the water content of the core that is received, but of procuring a core which has its original water content preserved. One of the most successful means of doing this is by means of a core taken with an oil-base fluid, although oil-base cores may be flushed of water content in regions where the water was not at its capillary irreducible value. Another means of coring which does not maintain original water content but gives a calculation of invaded water during coring, is that done by use of tracers, one of the most successful of which is dextrose.

The measurement of water content of a core can be done by several mechanisms. First, it can be distilled out and measured. This is the object of the familiar A.S.T.M. apparatus. The water is vaporized from the core by use of a high-vapor-pressure solvent with which it is immiscible, it is condensed thereafter, caught in a trap and measured volumetrically.

Rather than distill the water from the core the salt or mineral content of the water within the core can be removed and measured. The total salt content thus measured when divided by the known salt content per unit of connate water then gives the units of connate water which were in the specimen. The salt content is removed from a core by a boiling or leaching process. After removal, its total amount can be measured by electrical conductivity, by refractive index change, by filtration, by evaporation to dryness, or any other of a number of analytical techniques. The chief error of this method arises from not leaching the correct amount of salt from the core sample.

A third possible method of measuring the water content of the core specimen obtained in the laboratory is by means of the conductivity of the sample while it contains the water. This is a technique similar to that used in measuring water content of flow systems in research work. It is based upon the fact that at a partial water saturation a reservoir rock has a certain fractional conductivity of that which it would possess at 100 per cent water saturation. Therefore, if the conductivity of the specimen is measured and divided by the conductivity measured when the system is 100 per cent saturated, the per cent water saturation is known. This method, of course, requires a calibration curve between per cent water saturation and the physical quantity measured (conductivity ratio), as does any other method where water content is determined indirectly.

A method of determining connate water which does not require a core with its original content is that known as "the restored state method." (This has been discussed in detail in Engineering Fundamentals Nos. 329 and 330.) This method assumes that a core can be cleaned and resaturated to the same value of water content that it held originally because the original water was held in by capillary forces. In the laboratory the technique is to saturate the desired specimen with a connate water and displace as much of it as possible with either air or oil. After the maximum amount of water has been displaced, the remainder is the connate-water value. An extension of this method does not even utilize a connate water but measures an equivalent saturation by the injection of mercury under pressure until no further mercury can be injected.

One method exists for determining connate-water content of a reservoir formation in place. This is by the technique of electric well logging, making use of the resistivity properties of the formation. The same principle is involved as for measuring water content of a core specimen in the laboratory by electrical conductivity. That is, the actual resistivity is known by logging. The resistivity of the bed if fully saturated can be determined by fully saturating a core specimen in the laboratory. The ratio of resistivities then gives a water saturation by reference to a calibration curve or a set of curves obtained by correlation of many known circumstances. The connate-water content can be determined by a simplification of this process without determining resistivity of a fully saturated core specimen where such characteristics as porosity, saline content of the formation water, and type of formation are known. This method employs charts or graphs which relate such known characteristics to electrical conductivity values.

In general, as with all other analytical techniques, each of these methods outlined has a particular application, a circumstance under which it gives the most favorable answer. In many cases, it has been shown that connate-water values obtained by all three methods (coring, logging, and restored state) are in good agreement.[1,2,3]

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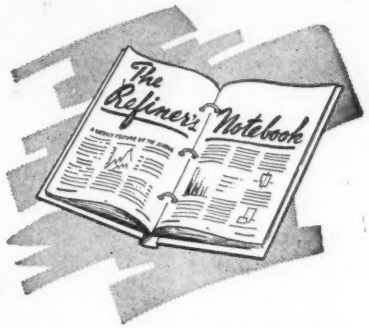

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

Petrochemical and Small Tanks

TABLE 1—REFINERY RUNDOWN[1] TANKS
(No foundation or paint)

Gal.	Bbl.	M. & L. 1946 ($ per bbl.)
10,000	238	3.78-5.66
20,000	476	3.02-4.24
50,000	1,190	2.27-3.40
100,000	2,380	1.76-2.56
200,000	4,760	1.26-1.97

TABLE 2—BOLTED OIL-FIELD STOCK TANKS[2] (1946)*

Capacity (bbl.)	Delivered and erected, per bbl.		Labor, per bbl.	
	10 ga.	14 ga.	Take-down	Reset
65	$4.48	$4.04	$0.31	$0.59
100	3.74	3.35	0.25	0.42
200	2.73	2.42	0.18	0.30
L-500	2.23	1.95	0.10	0.23
H-500	2.02	1.78	0.10	0.24
H-1,000	1.56	1.38	0.07	0.18

*The delivered (West Texas) price of welded stock tanks of usual thicknesses cost 20-25 per cent more.

TABLE 3—APPROXIMATE COST OF SMALL FLAT-HEAD AND DISKED-HEAD CHEMICAL TANKS[3] (1946)
(Mounted on legs, complete with connections—per gallon)

Capacity (gal.)	Carbon steel		Rubber lined		Stainless steel		Glass lined	
	Plain	Jacketed	Plain	Jacketed	Plain	Jacketed	Plain	Jacketed
200	$0.43	$0.57	$1.33	$1.47	$2.10	$2.26	$1.76	$2.70
400	.36	.46	.96	1.05	1.73	1.83	1.33	1.91
600	.33	.41	.79	.88	1.53	1.58	1.11	1.61
1,000	.27	.35	.62	.68	1.29	1.34	.90	1.27
1,400	.25	.31	.53	.59	...	...	.76	1.07
2,400	...	...	...	...	...	...	.54	.79

TABLE 4—ALLOY AND SPECIAL-STEEL CONE-ROOF CHEMICAL TANKS[4] (1946)
(Material, fabrication and erection—cents per gal.)

Capacity (gal.)	Monel or No. 316 stainless steel	Monel clad, inconel clad or No. 304 stainless steel	Nickel clad, and Nos. 316, 347, or 304 stainless clad
25,000	56-64	45-50	36-43
50,000	36-41	30-35	24-28
100,000	26-30	22-29	17-21
150,000	23-25	18-21	15-17
200,000	21-23	16-19	13-16
250,000	19-21	15-17	12-14

TABLE 5—REDWOOD OIL-FIELD STOCK TANKS[5] (1946)
(Complete and erected)

Capacity (bbl.)	Dollars per barrel		
	2-in. wall	3-in. wall	Takedown and reset
250	2.68	3.70	0.46
310	2.42	3.30	0.40
500	2.08	2.86	0.34
625	1.81	3.94	0.29

TABLE 6—APPROXIMATE COST OF WOOD CHEMICAL TANKS[6] (1946)

Size, bd.-ft.—	Cents* per board-foot†		Erection, per cent of material
	Cypress or Redwood	Fir or yellow pine	
500 and smaller	56	42	60-100
1,000	49	40	40-60
2,000 up	41	37	40-60

*Complete with hoops—but galvanized fittings cost about 8 per cent more. †One board-foot is a square foot area, 1 in. thick.

Aluminum tanks costs[4] are about as follows (1946), and 40 per cent should be added for erection:

Gallons	Per pound
15,000-18,000	$1.70
50,000	$1.28-$1.37
100,000	$1.07

The cost of linings[6] for chemical tanks (converted to 1946) are about as follows:

	Per sq. ft.
Lead (1/8 in.)	$2.45
Acid resistant asphalt and asbestos felt	$1.30-$1.85
Bituminous paint	$0.41

Gunite liners were mentioned in Cost-imating (Refiner's Notebook) No. 5 of November 18.

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No. 6 in a series by W. L. Nelson, professor of petroleum refinery engineering, University of Tulsa

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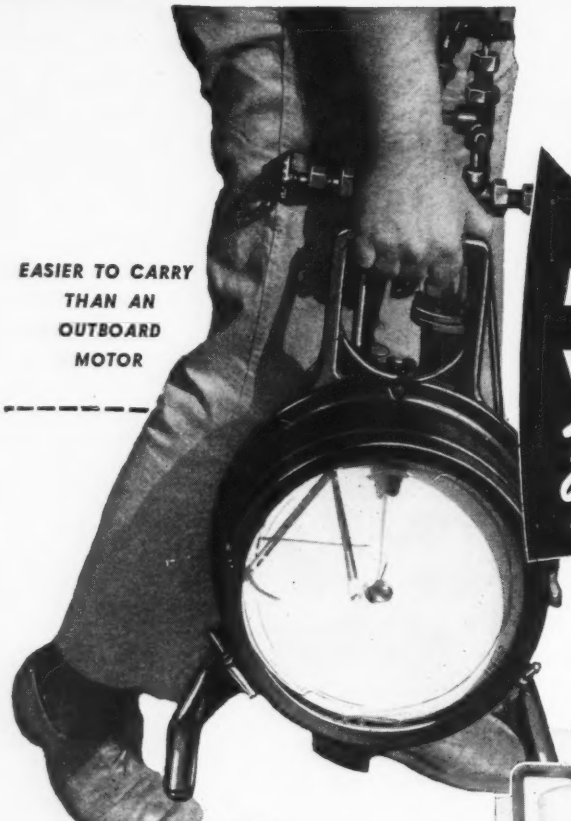

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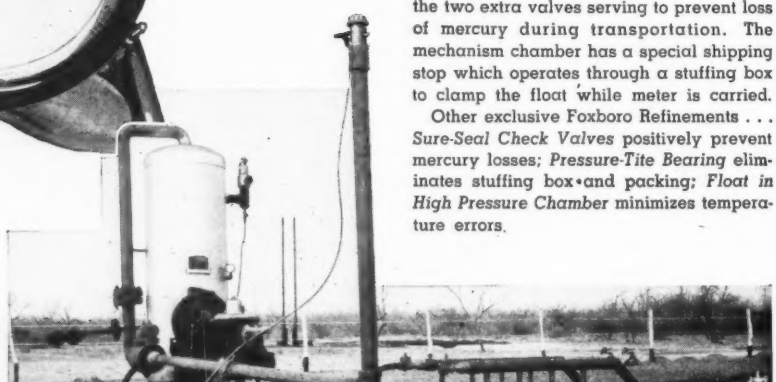

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NATURAL GAS

Panhandle-Hugoton Lease Trade Delayed by FPC

FEDERAL POWER COMMISSION has set hearing to begin January 24, 1949, on an investigation involving the transfer by Panhandle Eastern Pipe Line Co. of natural gas reserves in Grant and Stevens counties, Kansas, to Hugoton Production Co.

FPC has stated that Panhandle organized Hugoton Production Co. as a Delaware corporation and that all of the officers and directors of Hugoton are identical with those of Panhandle. The commission said that Panhandle and Hugoton entered, or attempted to enter, into a contract involving the issuance of 810,000 shares of Hugoton stock to Panhandle in exchange for $675,000 in cash and the transfer to Hugoton of Panhandle leases covering approximately 97,000 acres of natural-gas lands in Hugoton field of Kansas.

These particular leases, the FPC stated, are among those which Panhandle has from time to time presented as justification of its applications to the commission for authorization to construct additional facilities. By reason of this action, the commission believes Panhandle is obligated under the Natural Gas Act to continue devoting this reserve to the service of already authorized facilities until it is determined that the reserves are no longer needed. Under the agreement between Panhandle and Hugoton, the FPC pointed out, Hugoton plans to develop the acreage promptly and negotiate sales of gas to parties other than Panhandle.

Meanwhile a federal court in Delaware, at the request of FPC, has signed a temporary restraining order enjoining Panhandle from paying to its stockholders a dividend of 810,000 shares of capital stock of Hugoton Production Co.

Hearing Set for Arizona-California Gas System

HEARING has been set for December 6 by the Federal Power Commission on applications filed by El Paso Natural Gas Co., San Juan Pipe Line Co., and Pacific Gas & Electric Co.

El Paso plans to build facilities for transmitting 400,000,000 cu. ft. of natural gas a day to Pacific at the Arizona-California border near Needles, Calif. Of this amount, 150,000,000 cu. ft. is to be purchased from San Juan, and 250,000,000 cu. ft. is to be obtained in the Permian basin area.

El Paso plans to build 192 miles of 30-in. and 26-in. line looping its present 26-in. line from the Permian basin, 95 miles of 24-in. line in Texas, 102 miles of 26-in. and 17 miles of 30-in. line from the Gila compressor station in central Arizona to a connection with the proposed San Juan line, and compressor stations with 80,840 hp. Estimated total cost of this project is $52,456,032.

San Juan is asking authority to build facilities to move 150,000,000 cu. ft. of natural gas daily to El Paso's line at a point 20 miles east of Needles, in Mohave County, Arizona. It plans to buy its gas in San Juan County, New Mexico.

San Juan's proposed facilities include 451 miles of 26-in. pipe line, a 3,300-hp. main-line compressor station, 121 miles of feeder and gathering lines and a 3,000-hp. field compressor station. Estimated cost of this project is $28,000,000.

Pacific Gas & Electric plans to build 510 miles of 34-in. line from California boundary near Topock, Ariz., to its terminal near Milpitas, Calif., and 67,056-hp. compressor station facilities. This project, estimated to cost Pacific $65,275,000, will enable the company to sell natural gas to customers in northern and central California. *(For further details see page 141.)*

Delhi Oil Corp. has contracted with El Paso Natural in forming San Juan Pipe Line Co. to build the line from the San Juan basin to the Arizona-California border.

Ownership of San Juan stock is to be 50 per cent by Delhi and 50 per cent by El Paso, with El Paso having the right to elect three-fifths of the San Juan directors. FPC recently reaffirmed its previous decision that Delhi be considered a "natural-gas company."

Gas Pressure Plant Begun

General Petroleum Corp. has begun construction on a new pressure maintenance plant 17 miles from Worland in Sand Creek field of north-central Wyoming. The plant will process about 1,500 cu. ft. of gas for each barrel of oil produced from 11 wells. Built at a cost of approximately $700,000, the plant will go into service next month.

Natural Gasoline

Elk Basin Gasoline Plant To Be Ready in February

With construction better than 50 per cent complete, Stanolind Oil & Gas Co. is aiming at a final completion date of April 1949 for the Elk Basin, Wyo., gasoline plant.

Stanolind is building the plant and will operate it for members of the Elk Basin unit agreement consisting of Stanolind, Continental Oil Co., Carter Oil Co., Ohio Oil Co., and Mackinnie Oil & Drilling Co.

Installations are expected to be far enough along to permit starting of operations by February 1949, with final completion 2 months later. While primarily a gasoline plant of the conventional type, it will also produce sulfur and will generate inert gas for injection into Elk Basin field.

Not enough gas is produced from Elk Basin field to carry out the injection program, so more must be made. This is done by burning natural gas with air. About 10 times as much gas results, which is compressed for injection.

The Elk Basin plant will produce about 12,000 gal. of gasoline and 39,000 gal. of butane and propane daily. It will have a capacity of 12,000,000 cu. ft. of feed gas per day.

Gas from the field is about 20 per cent hydrogen sulfide.

Skelly Starts Gasoline Plant in Eunice Field

Skelly Oil Co. has announced that it has started construction of a compression and absorption type gasoline plant in Eunice, N. M., field to be known as Eunice No. 2 plant, to augment the existing facilities of its Eunice No. 1 plant located in the same field.

The added facilities are needed, according to company officials, to provide sufficient capacity to process the casinghead gas now under contract to the company. Gasoline produced at the plant will be transported to Eunice No. 1 for further treatment. Completion is expected by April 1949.

Canada Gets Propane Plant

Western Propane, Ltd., of Calgary, has opened a propane plant in Turner Valley field, the first plant in Canada designed specifically for the manufacture of propane gas in commercial quantities. Small amounts of propane gas have been manufactured and sold in Canada as a minor byproduct of oil refineries. However, the new $500,000 Turner Valley plant is the first constructed solely for the manufacture of gas.

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One of the most important and profitable benefits refiners gain from Petreco Electric Desalting is *increased refining capacity*. This ability to charge more crude results directly from the high efficiency of Petreco Desalting, which

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REFINING

Sinclair Will Close Coffeyville Kans. Plant

SINCLAIR REFINING CO. has announced that it will close its plant at Coffeyville, Kans., within the next few weeks. Closing the 13,000-bbl.-per-day crude-oil capacity plant has been contemplated for some time and is in line with the company's intention of serving markets with products transported through their products pipe line. The plant, which has complete facilities, has a cracking capacity of 7,000 bbl. per day.

Sinclair had previously closed plants at Fort Worth, Tex., and at Kansas City, Kans., and plans include the eventual shut down of the Sand Springs, Okla., plant.

The company has found that service to markets through a products pipe line and a few large refineries has economic advantages over operation of many small refineries.

Employes affected by the change are offered opportunity to transfer to other company locations, take retirement allowances, or severance pay. About 500 persons are employed at the Coffeyville plant. Sinclair will continue to use the Coffeyville site as a pipe-line and marketing terminal for Sinclair products.

New Type Products Barges Made by Dravo Corp.

An entirely new design of integrated tank barges will be employed by Dravo Corp. of Pittsburgh, Pa., in construction of two barges to be delivered to Mid-Continent Barge Line Co. of Minneapolis, Minn., for transportation of petroleum products on inland waterways.

Dravo announced that the new hull form of these units will have the lowest ton-mile resistance of any such fleet built by the company. Each of the two barges will be 240 ft. long, 50 ft. wide, and 12 ft. deep. Together the barges will have a capacity of more than 40,000 bbl.

McColl-Frontenac Enlarges Toronto Processing Plant

McColl-Frontenac Oil Co., Ltd., manufacturer and distributor in Canada of Texaco petroleum products, will double its current capacities with new grease manufacturing and lubricating oil compounding facilities now nearing completion.

Consisting of four new buildings, the new plant, located at Toronto, is designed to process 10,000,000 imperial gallons of lubricating oils and 12,000,000 lb. of grease and gear lubricants per year.

One large three-story building will house all blending and compounding facilities, grease-manufacturing equipment using steam kettles, canning and drumming facilities and office and laboratory requirements. Other buildings will contain fire heated grease kettles, drum reconditioning equipment, tankage, pumps and manifolds.

Texas Gas Condensate Plant Is Expanding Capacity

United Gas Pipe Line Co. is expanding facilities to increase the present gas processing capacity from 100,000,000 cu. ft. to 215,000,000 cu. ft. per day at its plant near Carthage, Tex. Additions will be completed during May 1949.

Already one of the largest gas condensate plants in the nation, it is designed with its present equipment to recover 150,000 to 170,000 gal. of products including motor fuel, gasoline, kerosine, propane, butane and isopropane.

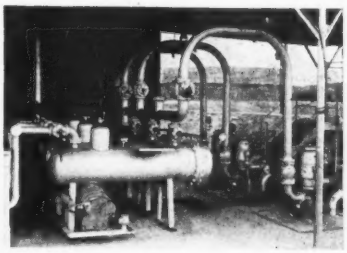
The productive area now served by the plant covers 250,000 to 300,000 acres, entirely within the limits of Panola County. Included in expansion plans is an increase in products storage from 4,250,000 gal. to 7,000,000 gal.

Hydrocarbon Standard Samples Now Total 150

Through a cooperative program begun in 1943, the National Bureau of Standards and the American Petroleum Institute have prepared a total of 150 compounds now available as NBS standard samples of hydrocarbons for calibrating analytical instruments and apparatus in the research, development, and analytical laboratories of the petroleum, rubber, chemical, and allied industries.

A complete list of NBS standard samples of hydrocarbons together with instructions for ordering may be obtained from the National Bureau of Standards, Washington 25, D. C.

Seven standard samples of rubber compounding ingredients have been



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Solve the Problem

3-HP-300 (300 gpm) 150# w. p. SOD EXCEL-SO Separators filtering pipe scale and removing water from products pipe line. Note air eliminator domes and mechanisms now built into separators, where required.

MASSACHUSETTS PIPE LINE CO.

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CHEMICAL MEASURING
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added to the NBS list of standard samples supplied to industrial and scientific laboratories.

A. P. I. Refinery Division Plans Meeting in Houston

The division of refining of the American Petroleum Institute will hold its mid-year meeting in the Shamrock Hotel, Houston, Tex., April 4-7, 1949.

In addition to the usual committee meeting, there will be group sessions on training in refining, waste disposal, analytical chemistry, and corrosion. The automotive research committee also will sponsor a group session on problems pertinent to the utilization of automotive fuels.

Of particular importance will be a session on refinery management which will include papers on the scheduling of work, allocation of manpower and use of labor-saving devices, and other subjects of interest to operating management.

Oxygen Plant in Place for Coal-to-Oil Demonstration

A tonnage oxygen plant, the first to be used for coal gasification purposes in this country has been brought from Hochst, Germany, and will be placed in operation in a few weeks by the U. S. Bureau of Mines at the coal-to-oil demonstration plants at Louisiana, Mo.

Feasibility of using oxygen in the production of synthetic oil and gasoline from coal depends entirely, according to Bureau engineers, upon the cost of oxygen, and the Linde-Frankl unit brought from Germany has a capacity of 23,000 cu. ft. or 1 ton per hour of 98 per cent oxygen.

Originally the unit was used by I. G. Farbenindustrie in making acetic acid and other chemicals. It was dismantled and shipped to the United States complete save for building, piping, and other materials available here.

Sinclair Perfects New Cracking-Unit Silencer

Sinclair Refining Co. engineers working in conjunction with the makers of the Maxim silencer for firearms have perfected the first successful apparatus to reduce the loud noises and roar of catalytic cracking units used in oil refining, and the gas exhaust noise to a point where it is no longer objectionable.

The new mufflers have been installed on the new catalytic units at the Sinclair East Chicago, Ind., and Marcus Hook, Pa., refineries. The effectiveness of this apparatus has been proven by extensive decibel tests.

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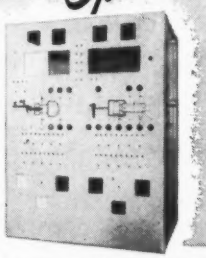

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1. Increases dynamic strength for greater resistance to hydraulic shock pressures.
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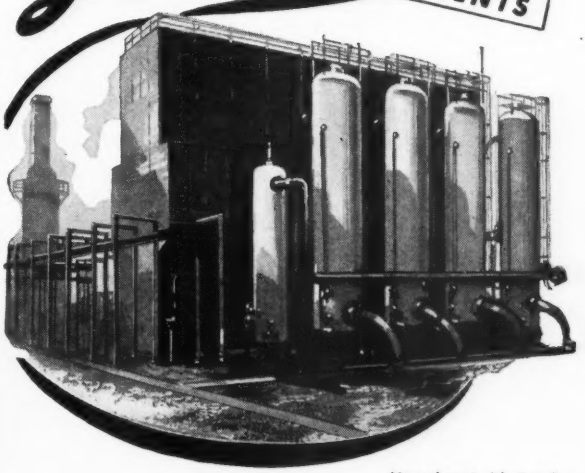

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Activated Bauxite

acts many parts

Adsorbent	Filter Aid	Drying Agent
Bleaching Agent	Catalyst	Filler
Colloidal Gel	Catalyst Carrier	Suspension Builder
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Oil Refining	Pipe Line Drying
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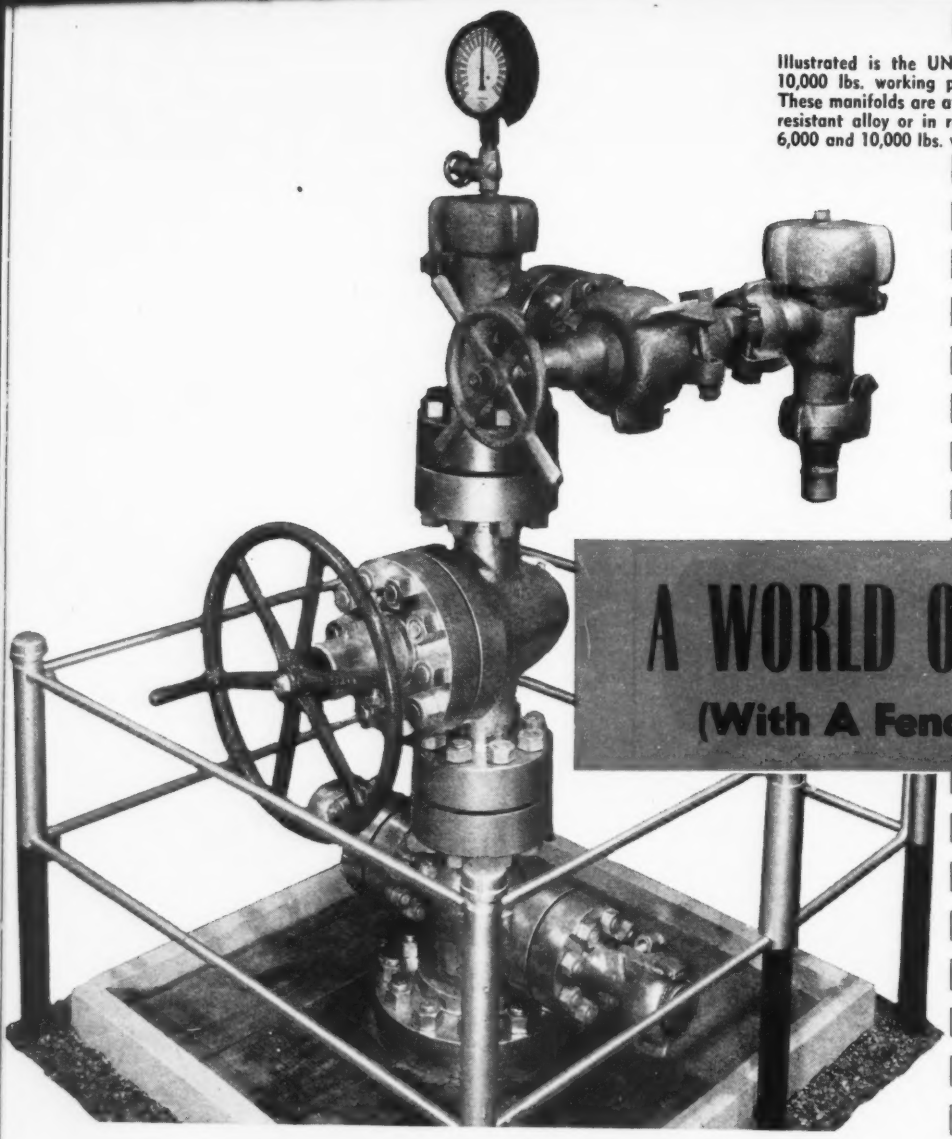

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(With A Fence Around It)

UNIBOLT *Flow Manifold*

The UNIBOLT Flow Manifold was designed to eliminate much of the bulk and weight of conventional flanged Christmas trees, yet, because of the patented UNIBOLT design, this manifold actually provides a higher factor of safety than the heavier flanged manifolds.

The use of a UNIBOLT Adjustable Wing Valve instead of an ordinary gate or plug valve on the wing is an innovation that has met with the approval of numerous operators, due to the fact that it provides a dependable and easy operable wing valve, requires no grease to effect a seal, costs substantially less, and can be completely overhauled without removal from the well.

Another important advantage of the UNIBOLT Flow Manifold is its complete interchangeability. All connections in the manifold are standard forged steel UNIBOLT Couplings, and any unit in the assembly, or part thereof, may be easily and quickly replaced in the field without removing the manifold from the well.

See your Composite Catalog for complete details, or write direct for literature.

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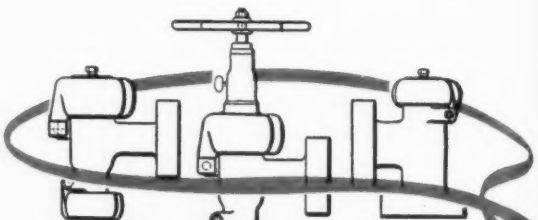

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PIPE LINES

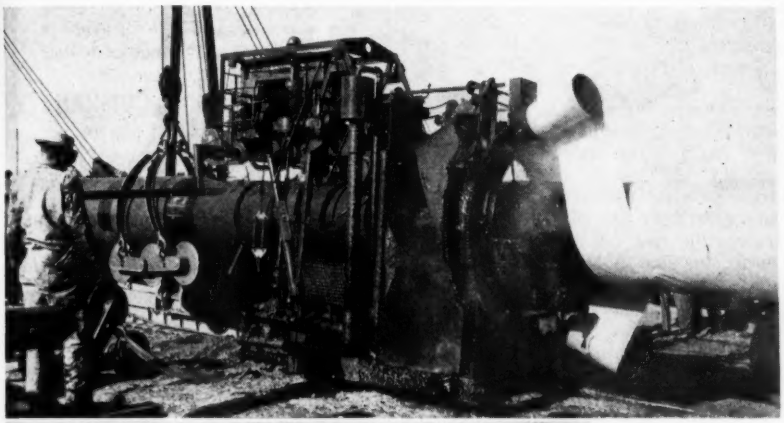
P. G. & E. Receives Bids For 510-Mile, 34-In. Line

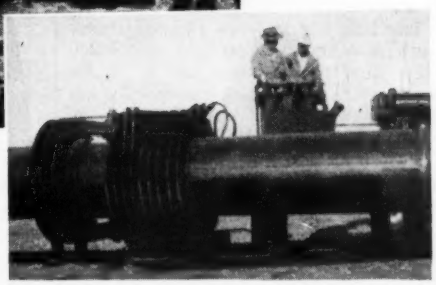
PACIFIC GAS & ELECTRIC Co. received bids early this week for the construction of a 510-mile, 34-in. natural-gas line from Topock, Ariz., 20 miles southeast of Needles, Calif., to Milpitas, 36 miles southeast of San Francisco.

Construction of the project, scheduled to start in the middle of 1949 will continue for 2 years.

This is the largest diameter trunk line planned for the natural-gas or petroleum industries in the United States. For these industries the largest diameter for existing trunk lines is 30 in. Additional expense for the 34-in. pipe will be offset by the advantages possible by the consequent reduction of compressor equipment, according to reports.

Present plans are said to call for protecting the pipe with double coating and wrapping by application of asphalt, glass mat and rag felt. P. G. & E. recently conducted tests of equipment for bending, welding and doping a mile of 34-in. pipe near Cen-





Since the 34-in. pipe for its 510-mile project will be larger than any laid for the pipe-line industry, Pacific Gas & Electric Co. recently conducted a test at Centerville, Calif., to demonstrate the ability of construction equipment for handling pipe of this diameter. The demonstration was conducted under the direction of R. S. Fuller, manager of gas operations, O. W. Peterson, chief engineer; J. A. Love, chief engineer of gas service; and Al Spratling, division superintendent of new construction, Pacific Gas & Electric Co. Doping and hydraulic machine bending operations were supervised by Jim Cummings of Crutcher-Rolfs-Cummings, Inc. Lineup by internal electric clamp equipment was under D. Michael Curran of M. J. Crose Mfg. Co., Inc. This is the first time that photographs of a pipe line job have been published before bids were submitted

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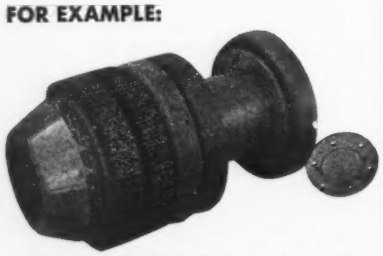
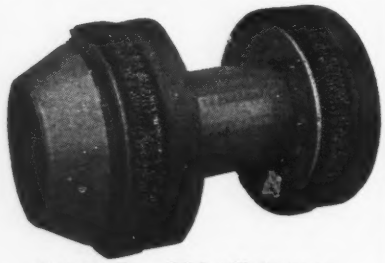
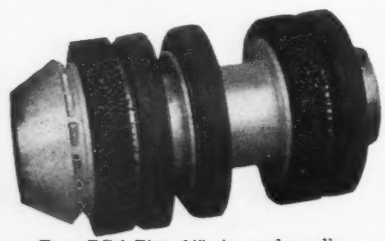


This Type RC-1 Pig, 16" size and larger, is for the usual conditions of:
Conventional gate valves
Full diameter, 90° laterals
Field bends, min. radius 10 ft.



This 22" Type RC-5 will traverse
Through-conduit valves
Full diameter, 90° laterals
Factory ells, 1½ radius, 22½°



Type RC-1 Pigs, 14" size and smaller, must traverse
Various types of gate valves
Elongated side openings (laterals)
Small-angle sharp bends

*Patents pending

THE PIG WITH THE POKE CLEANS PIPE LINES

T. D. Williamson, Inc.
TULSA 9, OKLAHOMA

terville, Calif., approximately 30 miles southeast of San Francisco. Photographs of this test are shown on page 141.

(See page 135, this issue, "Hearing Set for Arizona-California Gas System," for details of applications to FPC by P.G.&E., El Paso Natural Gas Co., and San Juan Pipe Line Co.)

Gulfcoast Northern To Lay 30-In. and 26-In.

PLANS have been amplified for Gulfcoast Northern Gas Co. which has filed application with the Federal Power Commission to construct a 30-in. line beginning at Falfurrias, Tex., and ending at a point near Chicago. This would be the primary line of the new system, to cost $119,000,000.

A proposed secondary line would pass through fields west of the Mississippi River, in Louisiana, from La Salle Parish through Plaquemines Parish. It has been definitely decided to lay two 26-in. lines, one on each side of the Mississippi River below New Orleans, and converging into a 30-in. line just north of New Orleans. This second line would bisect the state of Mississippi from south to north, passing through the approximate center of the distance between Baxterville and Gwinville, and continuing on just north of the city of Jackson and on into the primary line.

The price to be paid by the new line is 10¾ cents per thousand cubic feet with correction for deviation from Boyles Law. This deviation amounts to approximately 8 per cent. The highest price in Mississippi now being paid by any major pipe line is 7½ cents per thousand cubic feet without correction for deviation from Boyles Law.

According to reports from Gulfcoast Northern Gas Co., the proposed line would have an initial capacity of 245,000,000 cu. ft. per day. This would later be increased to an ultimate capacity of 350,000,000 cu. ft. per day.

The line would have 12 compressor stations with an aggregate of 115,200 hp. Allocation of steel has been assured "if certificate authority is granted within a reasonable time," the application stated. Actual construction on the line is planned within 180 days after the certificate has been issued.

Gulfcoast Northern Gas Co. is a new corporation formed under the laws of Delaware with main offices at Tulsa. F. E. Stanley, president of Midwestern Constructors, Inc., and Midwestern Contractors, Inc., is president of the new company. Vice president is John F. Lynch, La Gloria Corp. of Corpus Christi. Secretary and treasurer is Theodore Rinehart of Doerner, Rinehart & Stuart. Gas purchases and

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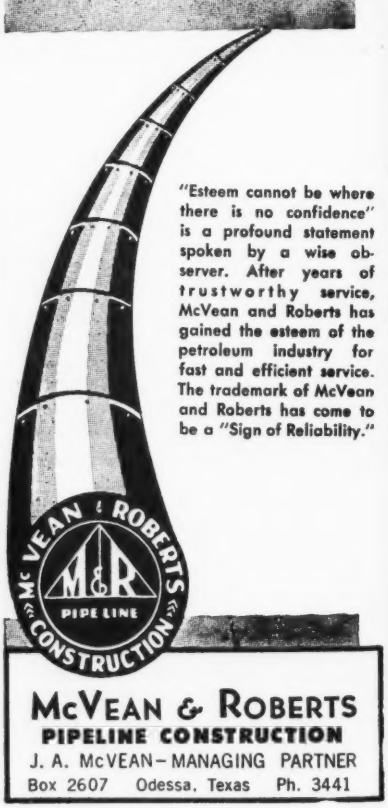

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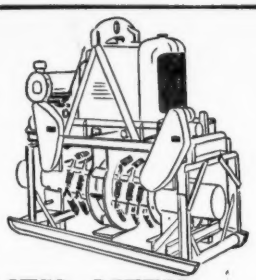

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contracts will be handled by Don Wallace.

Producers of the southwest will control the line through ownership of common stock. Midwestern Constructors, Inc., of Tulsa and Fish Engineering Corp., of Houston, will each own 15 per cent of the common stock. The remainder would be divided into 5 per cent units and distributed to the following: La Gloria Corp.; N. V. Kinsey, Sr. & Jr.; W. C. Feazel; Petroleum Consultants of Houston; Sid Richardson; W. G. Skelly; S. C. Canary, Zephyr Drilling Co., Tulsa; J. R. Sharp; S. N. Van Wert and Associates, Dallas; Chesslen Oil Co., Dallas; Alec Crowell for himself and Delta Drilling Co.; Doerner, Rinehart & Stuart, Tulsa.

In addition one unit of 5 per cent would be reserved for each of the following: F. E. Stanley, president of the company, and Theodore Rinehart, secretary.

The board of directors for the corporation are as follows: Clyde Alexander, president, Creslenn Oil Co., Dallas; N. V. Kinsey, independent operator, Carthage, Tex.; W. G. Skelly, president, Skelly Oil Co., Tulsa; Ray C. Fish, Fish Engineering, Houston, Tex.; and W. W. Matheny of the Sid Richardson interests, Fort Worth.

In the original announcement on the Gulfcoast Northern project *(The Oil and Gas Journal, September 2, page 36)* the plans for the system called for a 1,184-mile 26-in. line from the Gulf Coast to the Chicago area.

Shell Receives Bids For Ozark Stations

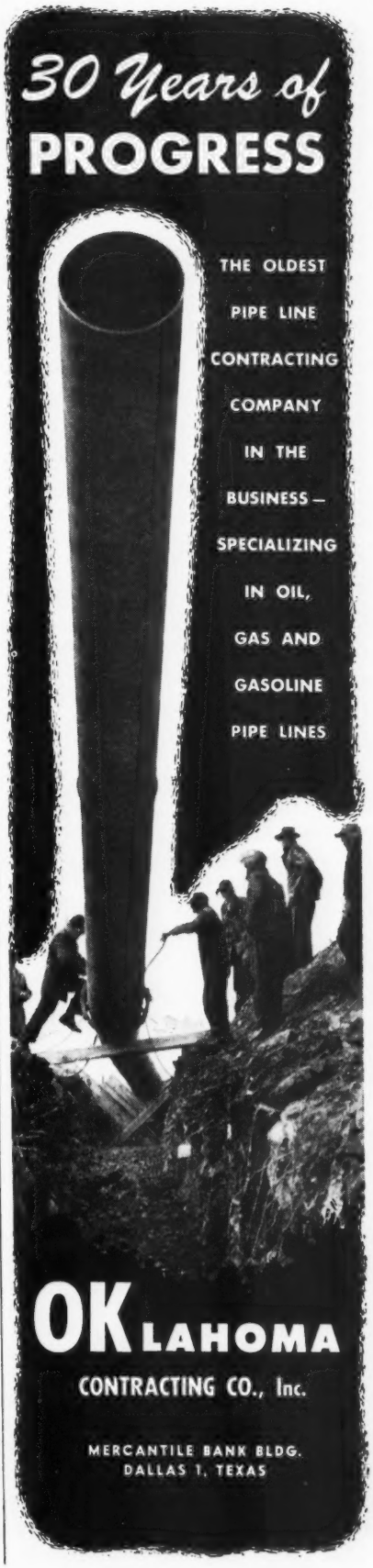
Shell Pipe Line Corp. received bids November 22 for the construction of pump stations for the 435-mile, 22-in. Ozark system to be built from Cushing, Okla., to Wood River, Ill. Station construction contracts will be awarded after November 29.

In connection with its contract to lay a section of the 22-in. line for the Ozark system, Anderson Brothers Corp. has subcontracted with George C. Bolz Construction Co. for the dredging of the Missouri and Mississippi River crossings.

Shell Wins Safety Award

At the recent National Safety Council annual congress held in Chicago, Shell Pipe Line Corp. won top awards in the 1948 contest and for the second time received the award of honor for distinguished service to safety.

For the least number of disabling injuries sustained by employes, the company placed first in the oil and gas line division of the petroleum section. Shell Pipe Line employes operated 1,272,630 man-hours without a disabling injury from January 16, 1948, to June 11, 1948.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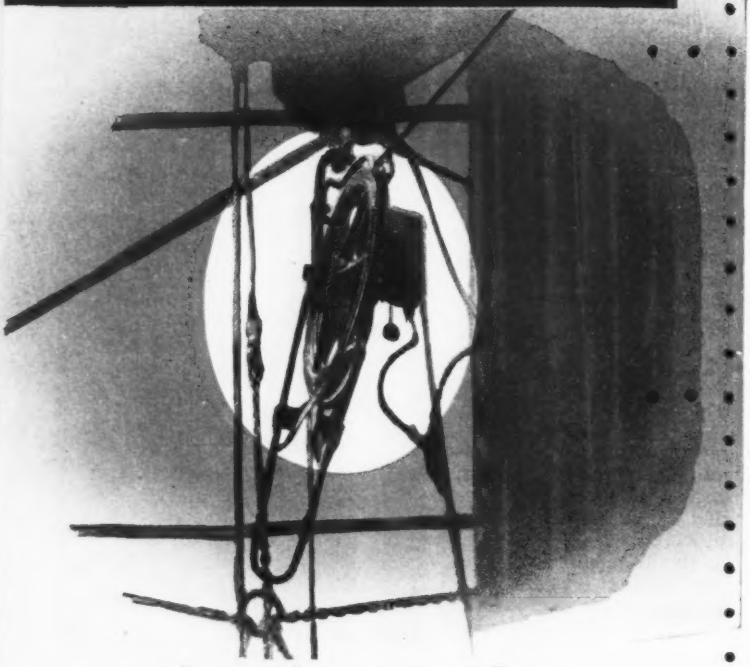

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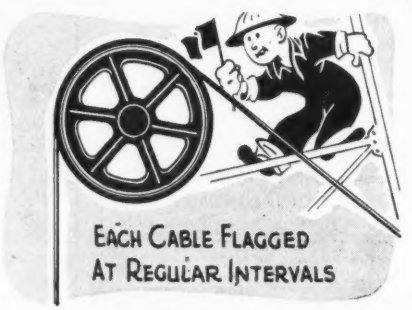

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Among the

Drilling Contractors

New Exploration Drilling Company Formed in Canada

A new Alberta organization, Alberta Devonian Exploration, Ltd., backed by Oklahoma interests, has been established with offices in Calgary. George Sinclair, of Tulsa, is president of the new company, which is scheduled to begin operations as a contract structure test driller.

W. G. Egbert, of Calgary, has been named vice president of the newly formed company, and Len Walker, of Calgary, manager and secretary.

Two Failing 44 units, capable of drilling 1,000 ft., are scheduled to arrive in Alberta soon.

New Safety Suit Is Considered by A. A. O. D. C.

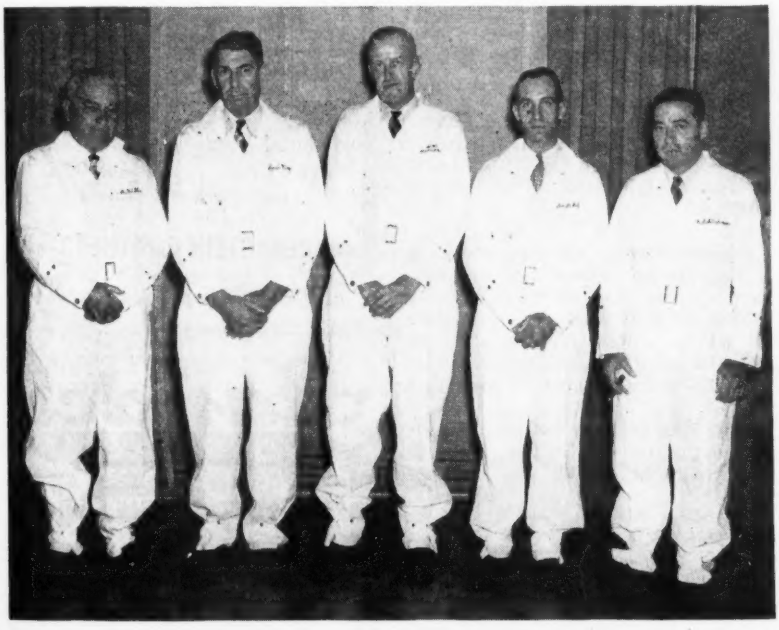
The insurance and safety committee of the American Association of Oilwell Drilling Contractors is considering the adoption of a new safety suit as recommended dress for field men. Thirteen such suits have been made up and are being sent to drillers and toolpushers in various areas for their reactions.

Among the features of the new suit are action back, extra seat and leg room, cuffless legs and sleeves, tight-fitting legs and sleeves, and double thicknesses of cloth at points of greatest wear. In addition, a band of luminescent material is attached to the sleeves of the costumes to indicate the position of workers at night.

2,422 Active Rotary Rigs Is New All-time High

Active rotary drilling rigs as of the end of October 1948 totaled 2,422 in the United States and Western Canada—an all-time record high, according to the Interstate Oil Compact Commission.

The new record marks the first time active rotary drilling rigs have been above the 2,400 figure. As of the



Shown here are five drilling-safety directors dressed in the latest recommended costume for oil-field workers: G. W. Hutchison, safety director, George P. Livermore, Inc., Lubbock, Tex.; Sam King, safety director, Kerr-McGee Oil Industries, Inc., Oklahoma City; W. W. Duncan, safety director, Loffland Brothers Co., Tulsa; Frank Thompson, assistant to vice president, Thompson-Carr, Inc., Midland, Tex.; and R. E. Dishman, safety director, Hunt Oil Co., Shreveport, La.

PENBERTHY

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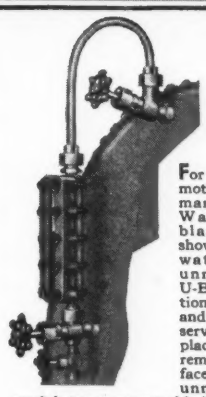
WATER GAGE SET



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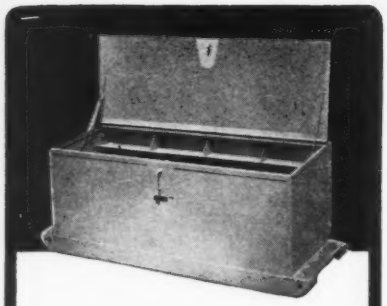

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Skid Length	8'	6'
Weight	1100 lbs.	525 lbs.

Built of heavy gauge sheet metal . . . heavily braced at all edges and corners . . . cover fitted with piano-type hinge and steel handle with hasp for padlock . . . in open position lid held by safety catch . . . mounted on sturdy skids.

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See Composite Catalog Page 2426

end of September and the three previous months the total of active rotary rigs had not dropped below 2,300.

Active rigs by areas as of the end of September and October were as follows:

	Sept.	Oct.
Pacific Coast	164	200
Oklahoma	290	292
Kansas	141	139
Rocky Mtns. (incl. W. Canada)	223	240
N. La., E. Tex., and Ark.	180	176
West Tex., and N. Mex.	599	603
Gulf Coast	576	604
Illinois	153	168
Total	2,326	2,422

Smith Brothers Drilling Co. was preparing last week to deepen 1 Newlin, in C SW SE of 19-25n-12w, Alfalfa County, Oklahoma, wildcat southeast of Dacoma, Okla. The well, abandoned in October, had been drilled to a depth of 6,218 ft.

Doris Ballew, Inc., has been awarded contract to drill Wanete Oil Co. 1 G. W. Armstrong in Section 17-9n-1w, Jefferson County, Mississippi.

Santa Fe Drilling Co. has contract to drill the J. Paul Getty Howard Park Fee 2, in the Athens field of California.

General Petroleums, Ltd., has been awarded contract to drill Central Leduc No. 7, LSD 15, 7-51-25w4, follow up to the company's recent lower Cretaceous producer in Leduc-Woodbend field in Alberta.

Delta Drilling Co. has abandoned its deep wildcat well in Clairborne Parish, Louisiana, 1 Meadors, in 1-22-7w, at a total depth of 10,710 ft.

John Mecom, Houston, Tex., has been awarded contract by Hassie Hunt, Tr., to drill 1 J. S. Broussard, a wildcat in Section 6-14s-1e, Vermilion Parish, Louisiana, to a depth of 13,000 ft.

Johnson-Flesher Drilling Co. was drilling below 1,478 ft. and has contract for the Wilcox sand at about 6,300 ft., at the Charles Mee 1 Wilson wildcat in C NE NW of 12-9n-1e, about 16 miles east of Norman, Okla., near the Pottawatomie County line.

T. P. Pike Drilling Co. has contract to drill Continental Oil Co. Grubb 61 in the San Miguelito field of California.

Clayton Drilling Co., of Taft, Calif., has staked a location for another wildcat near Parkford in Monterey County, California. The project to be known as Colgrove-Taylor 88-15, will be drilled in Section 15-23s-14e, about ½ mile from its 83-22, abandoned last month at 3,200 ft.

Nicklos Drilling Co., Houston, Tex., has contract to drill Continental Oil Co. 1 Hebert & Hebert, in Section 7-12s-3w, Abbeville field, Vermilion Parish, Louisiana, to a contract depth of 11,000 ft.

Bateman Drilling Co. has been awarded contract to drill Freeport Sulphur Co. 2 J. J. Martin et al, Section 28 field, St. Martin Parish, Louisiana, to a depth of 5,300 ft.

Can-Tex Drilling Co. has spudded in at the California-Standard Co. second follow-up well to the Bantry discovery about 100 miles south and east of Calgary. The well, Bantry-CPR No. 37-35, LSD 15, 35-17-13w4, has surface casing set at 286 ft.

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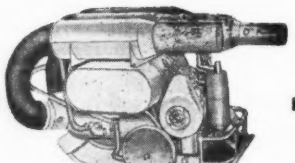

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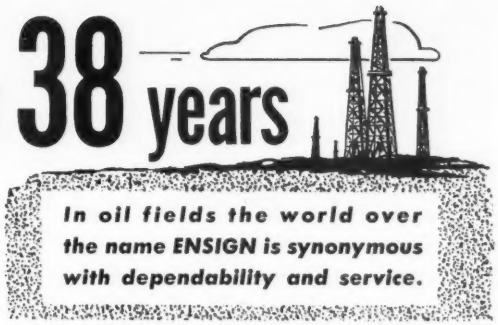

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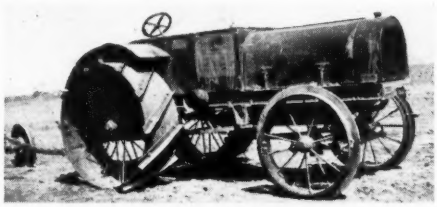
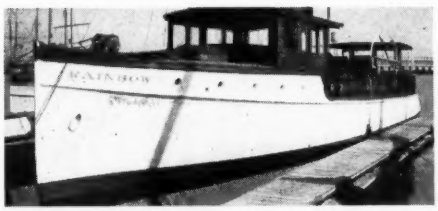
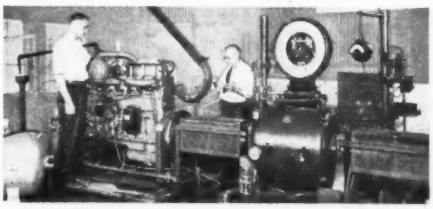


2—EARLY CARBURETORS incorporating patented Ensign principles were used on tractors, automobiles and trucks.

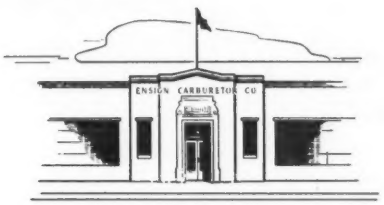


3—HEAVY FUEL CARBURETORS with spark ignited vaporizing chamber were popular on tractors and marine installations.

4—IN 1914 O. H. Ensign with his vigorous little company of technicians moved to new large quarters. Many domestic and foreign sales outlets were established. The majority of tractor builders adopted Ensign as standard equipment.



5—ONLY THE FINEST of laboratory test equipment is used at Ensign's. Many special instruments and machines to aid development of carburetors for natural gas, butane-propane and gasoline are Ensign built.



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Canada's Redwater Field Gets 5-Mile NW Extension

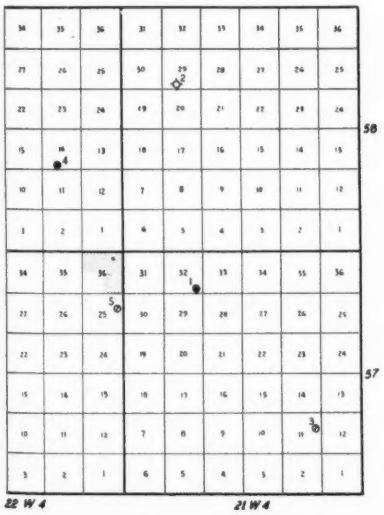
THE importance of the Redwater strike in Alberta last September was confirmed when Imperial Oil, Ltd., 4 Redwater, SE SW 14-58-22w4, a 5-mile northwest stepout recovered oil on drill-stem tests from the Devonian lime pay. Imperial 1 Redwater (see map), the discovery, has an open-flow potential of 1,700 bbl. daily of 35°-gravity oil from an indicated pay thickness of 140 ft. No. 2 Redwater, about 5 miles north of the discovery and roughly 3½ miles northeast of No. 4, the latest strike, missed the reef pay and has been abandoned. No. 3 Redwater, about 4½ miles southeast of the discovery, is not down to the pay yet. No. 5 is just getting under way.

After reaching the top of the pay and taking in 9 ft. of pay section, a drill-stem test at No. 4 Redwater resulted in a flow of oil to the surface in 48 minutes. Another 10 ft. of pay was cored, and a second drill-stem test made. This resulted in a recovery of 2,000 ft. of oil in the pipe during a 1-hour test. Further coring and testing is under way.

Official information on tops is lacking, but data available indicate that No. 4 should have about 70 ft. of pay section above the water-oil contact, as compared to 140 ft. of pay in the discovery well. From the location of the stepout wells (see map), one might interpret the location of No. 4 as probably on the northwest plunge of reef structure, with No. 3 in a similar location on the southeast. The failure of No. 2 would indicate a northwest-southeast axis, and assuming Nos. 1, 4, and 3 to lie close to the crest, the north flank already limited by No. 2's failure.

This same interpretation could be placed on the successful bids for Crown Reservation lands that have been announced. The shaded area on the map shows three quarter sections in 36-57-22w4, all Crown Reservation lands on which tenders closed November 10. Anglo-Canadian Oil Co. obtained the NE quarter for $351,000; Pacific Petroleums, Ltd.'s bid of $283,000 was good for the NW quarter; and Home Oil Co., Ltd., got the SE quarter for $302,000. These three quarters brought a total of $936,000, or an average of $1,950 per acre.

An interesting development was the announcement of Bear Oil Co., operating unit for the joint venture of Canadian independents, Sunray Oil Corp., Pacific Western Oil Co., and Tide Water-Associated Oil Co. *(See The Oil and Gas Journal, September 23, 1948, page 154.)* It has added nearly 600,000 acres in Townships 74, 75, and 76, extending east-west to its previous play. This acreage runs an east-west connecting bar across the oval-shaped play originally announced. The bar is about one-third of the way up from the south end of the oval.



HIGHLIGHTS OF WEEK'S DEVELOPMENTS

SOUTH LOUISIANA.—Stanolind Oil & Gas Co. 1 State Lease 1133, Block 45, in the Gulf of Mexico, aproximately 10 miles from the nearest point of the Louisiana shore line, Cameron Parish, is blowing gas and salt water, and operators are unable to control the well. It is reported the gas is coming from a thin sand stringer in a shale section, which is several hundred feet above the bottom of the hole. Total depth is 9,728 ft., with 13⅜-in. casing cemented at 2,482 ft. and 9⅝-in. at 8,511 ft. Pure Oil Co. 1 State Lease 880, Block 39, offshore Vermilion Parish, 8 miles out in the Gulf of Mexico and 13 miles southwest of Pecan Island gas field, has been completed as a dry hole at a total depth of 8,888 ft. A strong salt water flow was hit and operators are skidding the derrick on the platform to begin operations on the second test.

WEST TEXAS.—First Ellenburger oil for Midland County was reported at The Texas Co. 1 Scharbauer, south of the Midland Air Terminal, which recovered clean oil on a drill-stem test of the upper part of the formation. Gulf's Midland County wildcat, 1 Bryant, plugged back from the Ellenburger for completion tests in the Silurian.

NORTH TEXAS.—New Bend conglomerate production for northwest Montague County was reported at Tex Harvey Oil Co. 1 Capps, 2 miles south of Belcherville. Wise County has its first Ellenburger well, which flowed gas and distillate.

ROCKY MOUNTAIN AREA.—Stanolind Oil & Gas Co.'s Big Sand Coulee wildcat, Wyoming, is now drilling in the Tensleep below 13,000 ft. Saturation has been logged in the Wilshire—Atlantic wildcat at West Fourbear. Shows of gas and oil have been reported for Amerada Petroleum Corp.'s Green River wildcat in Utah. Latest reports indicate a good new pay producer at Pure's second West Poison Spider wildcat, Wyoming, which tested at the rate of 1,600 bbl. a day from the Mesa Verde at 9,230-88 ft.

PERMIAN BASIN

Midland Ellenburger Test Has Oil Show

MIDLAND.—The third well to reach the Ellenburger in Midland County, became the first to find oil in that formation. The Texas Co. 1 Clarence Scharbauer, about 12 miles southwest of Midland and 1 mile south of the Midland Air Terminal, entered the Ellenburger at 13,060 ft., and tested to 13,116 ft. Gas came to the surface in 15 minutes and the recovery was 500 ft. of water blanket, 50 ft. of high-gravity oil, and 180 ft. of oil-cut mud. No formation water was found. Operators were to drill ahead for another test.

The 1 Scharbauer entered the Ellenburger some 208 ft. higher than Gulf Oil Corp.'s 1 Bryant. The 1 Bryant was the county's second test to penetrate the Ellenburger. Humble Oil & Refining Co. 1 Buchanan, 14 miles southeast of Midland, entered the Ellenburger at 12,170 ft., but found only water.

Meanwhile, Gulf prepared to run 5-in. liner from 11,114 ft., where 7-in. casing was set, to plugged back total depth at 12,800 ft., and perforate to test the Fusselman at its 1 Wilson Bryant. It was dry in the Ellenburger at total depth of 13,822 ft. A previous 6-hour drill-stem test of the Fusselman section at 12,645-767 ft. recovered 540 ft. of gas-cut drilling mud, 2,250 ft. of oil and 210 ft. of salt water. Gas on the test was estimated at 78,000 cu. ft. daily.

In Andrews County, Sinclair Prairie Oil Co. 2-154 University, Ellenburger discovery in the northern section of the multiple-pay Shafter Lake region, found additional pay. First test to yield oil was from 11,695 ft., top of the formation, to 11,746 ft., which recovered over 6,000 ft. of clean oil, or around 95 bbl., according to some reports. Second test was from 11,800-847 ft. The tester was open 5 hours. Gas came to the surface in 4 hours and recovery was the water blanket plus 6,017 ft. of oil. Operators estimated the oil recovery at 86 bbl. Fluid started heading after 17 stands of drill pipe had been pulled. Combined production from the two pay sections was generally estimated at 50 bbl. of oil an hour. The section between the two levels tested was reported barren of oil. It was to drill another 50 ft. and test again.

On the south side of the Fullerton field, northwest Andrews County, Frank and George Frankel 3-I University, 1 location east of Ellenburger production, was a prospective new pay discovery from the lower Simpson. A 2-hour and 15-minute drill-stem test from 10,824-874 ft., using 2,000 ft. of water blanket, recovered the blanket plus 2,500 ft. of 40°-gravity oil, 180 ft. of oil-cut drilling mud, and no formation water. Open flowing bottom-hole pressure ranged from 1,000-1,700 psi. After 15 minutes, shut-in pressure was 3,700 psi. It will drill ahead to test the full Simpson section and probably into the Ellenburger. Location is 2,310 ft. from north and west lines of Section 32, Block 13, University Survey. According to one report, the 3-I University was checking low to wells to the west.

Perkins and Sun Oil Co. 1 Linthicum, Tom Green County wildcat 5 miles west of San Angelo, recovered 180 ft. of oil-cut mud and 100 ft. of mud-cut oil, on a drill-stem test of the Ellenburger from 6,435-84 ft. Gas came to the surface in 90 minutes, and there was no formation water. Operators were to run electrical surveys and set 5½-in. casing at 6,435 ft. for completion attempt. On elevation of 2,209 ft., it topped the Ellenburger at 6,435 ft.

In northwest Gaines County, Argo Oil Corp. continued testing its 1-N E. H. Jones, Section 496, Block G, CCS&RGNG Survey, Devonian discovery 2½ miles northwest of the Russell field. Perforated from 11,125-190 ft., in Devonian topped at 11,123 ft., it flowed 60 bbl. of oil in 1 hour, after two acid treatments.

Tide Water Associated Oil Co. 1 Turner, northwest Dawson County wildcat, 2¼ miles north of the Welch field, set 5½-in. casing to 4,959 ft., drilled out to 4,950 ft., then perforated at 4,915-21 ft. It was swabbed dry, then additional holes made from 4,880-4,913 ft., and again swabbed dry, showing some oil. Two acid treatments of both sets of perforations resulted in additional oil being swabbed. Operators were installing pumps to continue testing.

WEST TEXAS (DISTRICTS 8 & 7-C) SUCCESSFUL WILDCAT

Scurry County: Magnolia Petroleum Co. 1 Winston Bros., Tract 72, Sur. 37, Kirkland & Fields Subd., 3½ mi. SW Snyder, pumper 67 bbl. 34°-gravity oil, 24 bbl. salt water on initial potential, Pennsylvanian 7,428-37 ft., TD 7,905 ft. in Ellenburger dolomite, PB 7,460 ft., elev. 2,360 ft.

WEST TEXAS (DISTRICTS 8 & 7-C) WILDCAT FAILURES

Dawson County: James H. Snowden 1 W. H. Williamson, Sec. 108, Blk. M, ELRR Sur., 3½ mi. SE Cedar Lake field, dry, TD 4,995 ft., Yates 3,030 ft., San Andres 4,660 ft., elev. 3,109 ft.

Lubbock County: Honolulu Oil Corp. 1 W. C. Ratliff, Sec. 10, Blk. AK, ELRR Sur., 10 mi. SW Lubbock, dry, TD 7,027 ft., San Andres 3,800 ft., Glorietta 5,410 ft., Clear Fork 6,040 ft., elev. 3,285 ft.

Nolan County: Sun Oil Co. and Seaboard Oil Corp. 1 Mamie Haney, Sec. 32, Blk. X, T&P Sur., 10 mi. SE Roscoe, dry, TD 7,402 ft., Strawn 6,025 ft., Marble Falls 6,978 ft., Reef lime 6,336 ft., Ellenburger 7,395 ft., elev. 2,550 ft.

Pecos County: Swiss Oil Co. 1 University, Sec. 11, Blk. 19, University Lands, 8 mi. W Bakersfield, dry, TD 2,125 ft.

Sterling County: Ray A. Albaugh 2 Nellie Cannon Parramore, Sec. 201, Blk. 29, W&NW Sur., 13 mi. NW Sterling City, dry, TD 2,929 ft.

Terry County: Coline Oil Corp. 1 Oil Development Co. of Texas, Sec. 56, Blk. DD, J. H. Gibson Sur., 4 mi. NE Seagraves, dry, TD 3,490 ft.

SOUTHEASTERN NEW MEXICO

HOBBS.—Humble Oil & Refining Co. 1 Gorman-Federal, 30-15s-22e, Chaves County, ran a 40-minute drill-stem test from 5,282-5,338 ft., to recover 25 ft. of drilling mud with no shows. It drilled ahead below 5,410 ft. in lime and shale, and reported granite wash in samples around 5,170 ft. Barnsdall Oil Co. 1-A State, 23-8s-32e, ran electrical surveys at 11,113 ft., but did not report results. It is said to be drilling below 11,120 ft., in the Mississippian.

Lea County.—In the Crossroads area, Magnolia Petroleum Co. 1-C Santa Fe-Pacific, east of the discovery and only well, was drilling below 11,219 ft. Mid-Continent 1 Dessie Sawyer, 27-9s-36e, northwest extension try, was below 11,189 ft. Skelly Oil Co. 1 Sawyer, 33-9s-36e, ¾-mile southwest offset, was drilling below 11,328 ft. Mid-Continent 1-B Sawyer, also southwest in 34-9s-36e, was below 11,443 ft. It topped the Pennsylvanian Strawn at 10,550 ft., and was said to be slightly low to the discovery.

Amerada Petroleum Co. 1 J. R. Hamilton, 35-16s-38e, was drilling below 6,490 ft. in lime. It topped the San Andres at 5,080 ft., on elevation of 3,707 ft. Uscan Drilling Co. 1 State, 11-18s-36e, was said to be making a drill-stem test in dolomite at 5,257 ft., total depth. Phillips Petroleum Co. 1 Shipp, Ellenburger test in 20-18s-37e, had total depth at 7,300 ft. It cored 8 ft. of dolomite with sulfur odor at 7,288-94 ft.

The Texas Co. 1 Z. A. McMillan, 3-19s-37e, 2 miles northeast of production in the Eunice-Monument field, was drilling below 4,428 ft., corrected depth, after a drill-stem test at 4,389-4,413 ft. It had gas at the surface in 33 minutes and in 1 hour recovered 135 ft. of heavily oil and gas-cut mud. Gas was estimated at 2,000 cu. ft. daily.

SOUTHEAST NEW MEXICO SUCFUL WILDCAT

Lea County: J. C. Clower 1 State, NW SE 16-21s-34e, 2 mi. W of W. Eunice field, flowed 218 bbl. 29°-gravity oil in 24 hours, open 2-in., top Seven Rivers 3,936 ft., pay 3,945-48 ft., TD, elev. 3,750 ft.

SOUTHEAST NEW MEXICO WILDCAT FAILURE

Eddy County: R. L. Morton 1 Kerr, SE NE NW 9-22s-27e, dry, TD 3,010 ft., Delaware lime 1,856 ft., Delaware sand 2,021 ft., elev. 3,102 ft., salt water 2,028 ft.

SOUTH LOUISIANA

Sun Gets New Condensate Pool in St. Landry Parish

NEW ORLEANS.—A new gas-condensate pool has been opened by Sun Oil Co. 1 Swift, in the South Melville area of St. Landry Parish. Located in 23-4s-7e, 2½ miles southwest of Melville townsite, this well was drilled to a total depth of 12,500 ft., with 7-in. casing cemented on bottom. On initial test, the well flowed 190 bbl. of 54.8°-gravity condensate per day along with 2,148,000 cu. ft. of gas daily through a 12/64-in. choke. Gas-condensate ratio was 11,305 cu. ft. with flowing pressure on tubing at 3,125 psi. On another test, flowing 15 hours, the well made 150 bbl. of condensate through a 14/64-in. choke. Operators are ready to make a potential test. Production is through perforations at 11,-240-11,245 ft.

Roeser & Pendleton, Inc., et al 1 Columbia Land & Timber Co., is a new oil discovery south of the Bancroft field in Beauregard Parish. Located in 27-6s-13w. It was drilled to a total depth of 11,090 ft., with 5-in. casing cemented to 11,078 ft. On drill-stem test through perforations at 10,884-10,900 ft., using ¼-in. choke, the well developed 13 psi. maximum working pressure and flowed 150 bbl. of fluid per day, showing 90 per cent salt water and 5 per cent oil, and 5 per cent mud. Through perforations at 10,454-472 ft., it recovered 2,500 ft. of salt water, no shows of oil or gas. For the completion, pipe was perforated from 10,236-10,246 ft. and flow was 233 bbl. of 46.7°-gravity oil per day through a 16/64-in. choke. Gas-oil ratio 3,358 cu. ft.

A new oil discovery in Jefferson Davis Parish is W. T. Burton 1 Anna Byam Keith, 3-8s-3w, approximately 1 mile southwest of West Tepetate production. Total depth is 9,646 ft., with 7-in. casing cemented to 8,480 ft. Test is flowing 200 bbl. of oil per day. Perforations are not known, but completion is in the Ortego sand. Oil shows were reported in the Ortego from 8,397-8,441 ft.

Second well is completed in offshore Block 71, Vermilion Area field, by Superior Oil Co. The A-2 Gulf of Mexico-State, located approximately 19 miles off the Louisiana shore line in Vermilion Parish, in Block 71, State Lease 884, flowed at the rate of 49.8 bbl. of 51.2°-gravity condensate per day with flowing pressure at 3,620 psi., through an 18/64-in. choke. Total depth is 10,998 ft., and 8⅝-in. casing cemented to 10,000 ft.

There were 19 new locations reported this week with 5 being wildcat starts, 2 in Jefferson Davis and 1 each in St. Tammany, Vermilion, and West Baton Rouge parishes. One new oil pool was opened in Calcasieu Parish. One dry wildcat was completed in St. Landry Parish.

SOUTH LOUISIANA SUCCESSFUL WILDCAT

Calcasieu Parish: New oil pool, East Moss Lake area—Union Oil Co. of Calif. 1 D. C. Powell, 5-11s-9w, TD 9,303 ft., top sand 8,569 ft., perf. 8,569-74 ft., IP: 97 bbl. oil per day through 6/64-in. choke, GOR 629, TP 1,075 psi., gravity 35.3°.

SOUTH LOUISIANA WILDCAT FAILURE

St. Landry Parish: Pan American Production Co. 1 Leonie M. White, Leonville area, 121-6s-4e, 4 mi. NW of Leonville townsite, dry, TD 12,001 ft.

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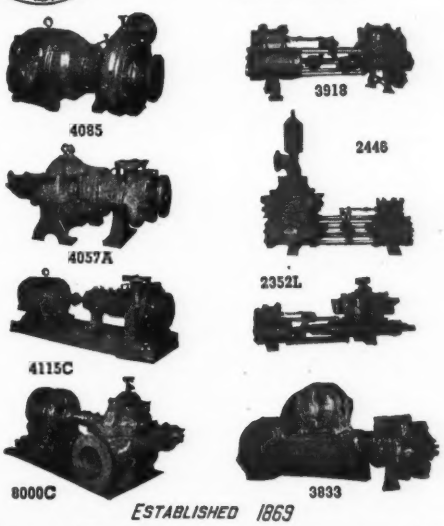

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APPALACHIAN FIELD

Preston County Gets New Oriskany Gas Strike

PITTSBURGH.—In Portland district, Preston County, West Virginia, Wm. E. Snee No. 1 Virginia Cuppett, elevation 2,137 ft., was acidized in the Oriskany sand after plugging back from a total depth of 8,942 ft. to 5,750 ft. The gas increased from 250,000 cu. ft. original open flow to 5,000,000 cu. ft. In Davis district, Tucker County, Cumberland Gas Co. No. 1-A-418 West Virginia Power & Transmission Co., elevation 3,296 ft., ran the 7-in. casing at 7,935 ft., logging the Corniferous lime at 7,931 ft. and the Onondaga chert at 7,959 ft. In Louden district, Kanawha County, Owens, Libby-Owens, No. 20-769 Great K. P. C. & L. Co., elevation 1,104 ft., is drilling in the Newburg sand at 5,532 ft. In Ripley district, Jackson County, South Penn Oil Co., No. 1 N. S. King, Clinton sand test, recorded the Corniferous lime at 4,622 ft.; 7-in. casing set at 4,642 ft.

New locations reported in West Virginia were 34: Union district, Barbour County; Cross Creek district, Brooke County; Sheridan and Sherman districts, Calhoun County; Ravenswood district, Jackson County; Harts Creek and Washington districts, Lincoln County; Sandhill and Webster districts, Marshall County; Harvey and Kermit districts, Mingo County; Slab Ford district, Raleigh County; Baileysville, Center, Oceana and Slab Fork districts, Wyoming County.

In Shade Township, Somerset County, Pennsylvania, Peoples Natural Gas Co., No. 3725 R. F. Grove, elevation 2,343 ft., went through the Oriskany sand at 9,126-9,165 ft. with no show of gas. Drilling is at 9,174 ft. New locations reported in Pennsylvania were six; Kittanning and Mahoning townships, Armstrong County; Red Bank Township, Clarion County; Washington Township, Indiana County, and Porter Township, Jefferson County.

WEST VIRGINIA SUCCESSFUL WILDCAT

Preston County: In Portland district, Wm. E. Snee, No. 1 Virginia Cuppett, elev. 2,137 ft., 5,000,000 cu. ft. of gas, after acidizing, Oriskany sand 5,628 ft., gas 5,630-5,638 ft. and 5,694-5,695 ft. TD 8,942 ft.

SOUTHWEST TEXAS

San Patricio County Has New Oil Field

CORPUS CHRISTI.—A new oil field for San Patricio County has been opened by Southern Minerals Corp. 1 W. Foster, located approximately 1 mile northwest of the Morgan field, in J. J. Welder and Coleman-Fulton Pasture Subdivision, in George Morris Survey. On potential test well gaged 79.75 bbl. of net oil per day through a ¼-in. choke, with 25 per cent water reported with the flow. Tubing pressure 90-100 psi., with casing sealed. Gravity 34.5°, and gas-oil ratio 500 cu. ft. Total depth is 6,958 ft., and perforations for completion are 5,383-88 ft.

Atlantic Refining Co. 1 Gwynn, new oil discovery well in Aransas County, is being completed, flowing into pits through new perforations in the 7,209-19-ft. section. No gage has been made yet. On first test through these perforations flowed at the rate of 180 bbl. per day, making 75 per cent oil and 25 per cent water through a ⅛-in. choke. Operators squeezed perforations to seal off the water content. The well previously tested gas with spray of oil through perforations at 7,788-96 ft., 7,748-56 ft., and oil and water at 7,310-13 ft.

Lewis Oil Co. B-1 Oppenheimer & Lang, new discovery well in Frio County, 3½ miles southwest of Charlotte field, is shut in with 2,100 psi. equalized pressures on tubing and casing after cleaning out and flowing a very high gas-oil ratio from the open hole at 5,567-88 ft., in the Navarro zone. Well was drilled to a depth of 5,588 ft., and set 5½-in. casing to 5,567 ft. A hard sand cap had been logged at 5,542-43 ft., gas sand at 5,543-70 ft., oil sand at 5,570-88 ft. in the Navarro zone.

Production string of casing has been set to bottom at total depth of 11,282 ft., in Humble Oil & Refining Co. 1 S. K. East, wildcat test 16 miles south-southwest of Sarita, in Kenedy County, and a series of tests in deep zones is expected. The well already has indicated oil production at three levels on drill-stem tests run in open hole prior to setting pipe. Test at 5,975-82 ft. recovered 490 ft. of oil in 25 minutes, 3/16-in choke; test at 6,629-36 ft., recovered 405 ft. of oil and 188 ft. of salt water; and test at 7,084-93 ft. recovered 690 ft. of oil and 180 ft. of oil-cut mud.

There were 49 new locations reported for Districts 1 and 4, 11 being wildcat starts, 3 each in Duval and Nueces and 1 each in Brooks, Jim Hogg, San Patricio, Starr and Zapata counties. Two successful exploratory tests opened new pools, one a gas pool in Jim Wells and an oil pool, San Miguel, in McMullen County. Fifteen wildcats were dry, 3 in Webb, 2 each in Caldwell and San Patricio, 1 each in Aransas, Bastrop, Duval, Edwards, Kleberg, Nueces, Starr and Zapata counties.

SOUTHWEST TEXAS (DISTRICTS 1 & 4) SUCCESSFUL WILDCATS

Jim Wells County: New gas pool, Palito Blanco—The Texas Co. 1 Zella C. Foster, in Swanson Yarbrow Sur., 10 mi. S of San Diego, and approximately 5 mi. W-SW of Ben Bolt field, top pay 4,460 ft., TD 7,800 ft., perf. 4,460-70 ft., IP: 11,800,000 cu. ft. gas per day on open flow, gas-condensate ratio 69,894 cu. ft.

McMullen County: New oil pool, San Miguel—Atlantic Refg. Co. & Newman Bros. et al 1 Louis M. Gubbels, in G. H. Smith Sur. 26, 11 mi. N-NE of Tilden, top pay 5,421 ft., TD 5,425 ft., open hole 5,421-25 ft., IP: 84 bbl. oil per day through a 5/32-in. choke, GOR 335 cu. ft., TP 220-235 psi., casing sealed, gravity 35.4°.

SOUTHWEST TEXAS (DISTRICTS 1 & 4) WILDCAT FAILURES

Aransas County: Ladd Oil Co. 1 J. R. Berry Est., in Blk. 59, McCampbell Subd., 3½ mi. N of Aransas Pass, dry, TD 2,303 ft.

Bastrop County: George Cabbels 1 Charles G. Caldwell, in Jose Antonio Navarro Sur., 10 mi. W of Bastrop, 1 mi. E of Jim Smith field, dry, TD 1,225 ft.

Caldwell County: Luling O. & G. Co. 1 J. F. Webb, in Spencer Morris Sur., 3 mi. NE of Luling, dry, TD 3,260 ft.

Robert F. Roberts et al 1 A. T. Caldwell, in Pablo Martinez Grant, in Lytton Springs townsite, dry, TD 1,552 ft.

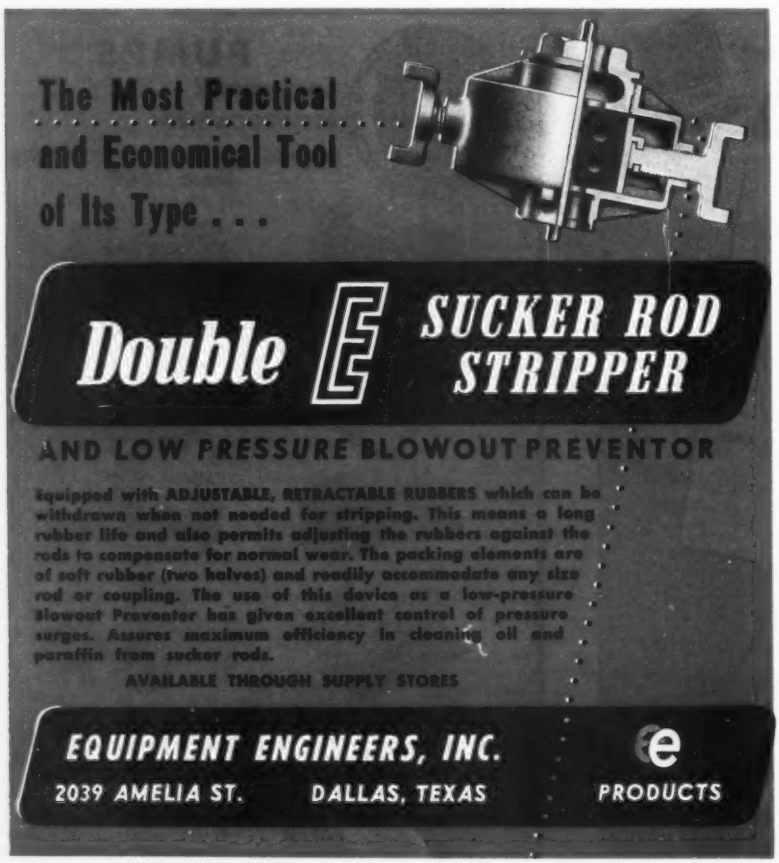
Duval County: Hancock Oil Co. of Calif. 1 Iva Hyatt, in Sweden Farm Lot 36, Santos Survey 9, 8 mi. W of Benavides, dry, TD 4,857 ft.

Edwards County: V. J. Meyer 1 S. N. Brown, in Sec. 66, GWTP RR Sur., 11 mi. W of Rock Springs, dry, TD 991 ft.

Kleberg County: Rudco O. & G. Co. and Bracken Oil Co. 1 Otto Nollkamper Subd. Unit 1, in Sec. 36, Kleberg Town & Impr. Co., Subd., 4 mi. SE of Kingsville, dry, TD 8,095 ft.

Nueces County: The Chicago Corp. 1 Clara Bluntzer, in Casa Blanca Grant, 8 mi. N of Banquete, dry, TD 6,511 ft.

San Patricio County: Armstrong & Sutton Drilling Co. 1 H. W. McNeil, Sec. 31, Cubage & Miller Subd. of Welder Ranch, H. C. McIntyre Sur., dry, TD 1,426 ft.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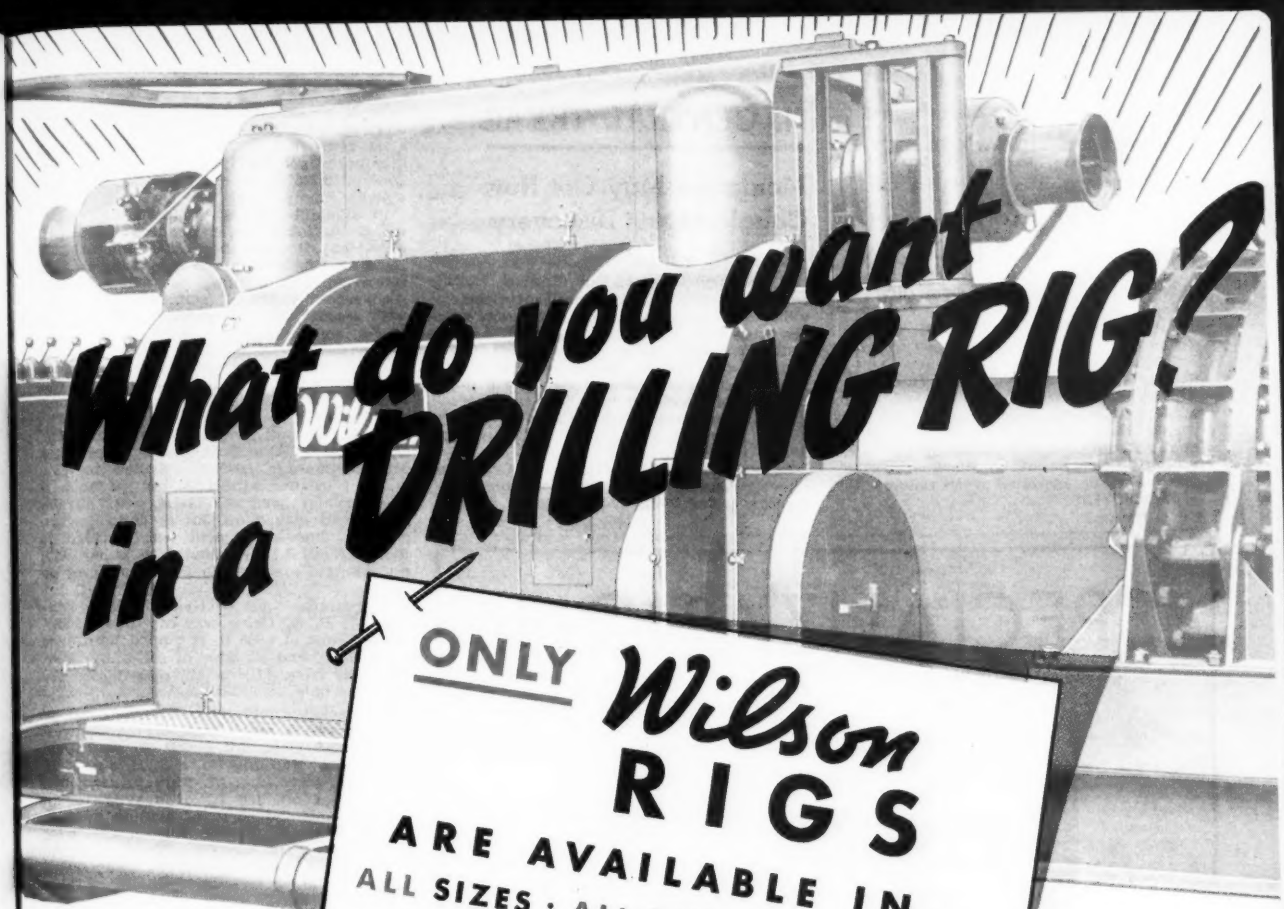

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Henshaw Bros. & O. R. Mitchell 1 G. Ragsdale et al, in Geo. H. Paul Subd. of Coleman-Fulton Pasture Lands, 6 mi. E-SE of Odem, dry, TD 10,020 ft.

Starr County: Coastal Refineries, Inc., & W. D. Kennard 2 D. R. Semmes, in Porcion 89, 17 mi. NE of Rio Grande City, dry, TD 3,025 ft.

Webb County: Sid Katz 2 A. M. Bruni Est., Sec. 6, Brown Subd., Albercas Grant, 1 mi. NW of Albercas field, dry, TD 2,156 ft.

O. W. Killam 4 Puig, in Albercas Grant, Sur. 12, 7 mi. SW of Mirando City, dry, TD 3,342 ft.

Taggart-Weaver & Sharp 1 B. G. Moglia, in J. Poitevent Sur. 722, 2½ mi. N of West Cole field, 11 mi. N of Bruni, dry, 2,474 ft.

Zapata County: Burton, Daubert & Achning 1 R. Hinnant, in Block 7, H&GN RR Sur. 10, 14 mi. S of Mirando City, dry, TD 1,785 ft.

N. CENTRAL TEXAS

Montague May Get New Conglomerate Discovery

WICHITA FALLS.—Tex Harvey Oil Co. 1 Beulah Capps, Block 81, J. H. Belcher Subdivision, 2 miles south of Belcherville, indicated another Bend conglomerate discovery for Montague County. It drilled conglomerate showing oil from 5,641-46 ft., where a 125-minute drill-stem test recovered 160 ft. of oil and 60 ft. of oil-cut mud. Bottom-hole pressure was 1,800 psi. Operators drilled ahead but were delayed by lost circulation and stuck drill pipe at 5,727 ft.

Continental Oil Co. 1 Staley, R. Crawford Survey, also in northwest Montague, perforated casing with 40 shots from 5,970-80 ft. and prepared to test. Total depth was 6,107 ft., with casing set to 6,080 ft. A drill-stem test from 5,979-97 ft. showed gas in 5 minutes and oil in 14 minutes, and recovered 3,725 ft. of oil, plus 225 ft. of salt water.

In Wichita County, Panhandle Producing & Refining Co. 1 Boyd, 4 miles east of Kamay, topped the KMA lime at 3,859 ft., drilled to 3,986 ft. and set casing to 3,930 ft. After drilling plug, a drill-stem test recovered 3½ bbl. of salt water an hour, with a scum of oil. It plugged back to 3,914 ft. for another test.

In Young County, 3½ miles north of Padgett, and 7 miles northwest of Mississippi production in the Padgett field, was in lime for some kind of discovery production when it blew out at 4,993 ft. The well is Lipscomb and Delange 1-A Swink, Block 301, TE&L Survey. It topped the Mississippian at 4,945 ft., drilled to 4,970 ft., and treated with 1,000 gal. of acid. It was drilling ahead at 4,993 ft. when the bit stuck, and kicked off out of control when a small amount of acid was injected to loosen the bit. The flow was killed with no estimate made as to the amount of oil or gas.

Three miles west of Graham, M. E. Andrews 1 P. K. Deats was dry in the Mississippi lime at 4,908 ft. It topped the Caddo at 3,859 ft.; had an odor of oil in the Marble Falls from 4,306-24 ft., and topped the Barnett shale at 4,633 ft.

In Shackelford County, 11 miles south of Albany, and 4 miles west of the Sedwick Ellenburger field, Intex Oil Co. and Danciger Oil & Refining Co. 1 R. B. and J. H. Elliott, Section 19, LAL Survey, recovered 1,175 ft. of oil, 180 ft. of heavily oil-cut drilling mud and 90 ft. of drilling mud on a drill-stem test of the Ellenburger from 4,293-4,316 ft. The test was open 1 hour. No estimate was made on the gas flow, which came to the surface in 7 minutes. There was no formation water. Location is said to be on a block of 4,000 acres acquired by Danciger out of the Elliott, Leech and Snyder ranches.

NORTH CENTRAL TEXAS (DISTRICTS 9 & 7-B) SUCCESSFUL WILDCATS

Montague County: Russell Maguire 1 R. A. Stewart, Blk. 19, J. Y. Costello Sur., 3½ mi. W Nocona, flowed 190 bbl. 43°-gravity oil in 4 hours, 32/64-in. choke, conglomerate 5,352-63 ft., casing pressure 495 psi., tubing 200 psi., GOR 750 cu. ft., TD 5,372 ft.

Wise County: Signal Oil & Gas Co. 1 Jack Daly, J. F. Williamson Sur., 3 mi. S Cottondale, flowed 4,019,000 cu. ft. gas, plus 170½ bbl. distillate a day, tubing pressure 795 psi., casing 1,668 psi., Ellenburger 6,512-22 ft., TD.

Young County: Humble Oil & Refining Co. 1 W. D. Daws, Sec. 770, TE&L Sur., 11½ mi. W Newcastle, flowed 57 bbl. 29°-gravity oil a day, 49 bbl. water, perforated 4,361-71 ft., TD 5,138 ft.

NORTH CENTRAL TEXAS (DISTRICTS 9 & 7-B) WILDCAT FAILURES

Archer County: W. G. Gouchie 1 A. J. DeMoss, C. A. Smith Sur., 2 mi. SE Archer City, dry, TD 1,225 ft. in shale.

W. G. Gouchie 1 M. A. DeMoss, C. A. Smith Sur., 2 mi. SE Archer City, dry, TD 1,212 ft.

W. B. Hamilton 1 J. Turner, TE&L Sur., 3½ mi. SE Megargel, dry, TD 1,357 ft.

J. J. Lynn 3 L. F. Wilson, ATNCL Sur., 8 mi. SE Holliday, dry, TD 4,098 ft.

Baylor County: A. R. Dillard 1 Robertson, CSL, 4 mi. S Fulda, dry, TD 3,135 ft.

Callahan County: Eastern States Petroleum Co. 1 W. T. McClure, Sec. 61, J. Sayers Sur., 6 mi. NE Cross Plains, dry, TD 3,940 ft., Ellenburger 3,927 ft., elev. 1,870 ft.

Eastland Oil Co. 1 Ray, Sec. 64, Blk. 14, T&P Sur., 3 mi. S Hamby, dry, TD 2,101 ft.

Coleman County: H. O. Newman 1 Monroe Forehan, Sec. 253, Blk. 13, D. H. Minor Sur., 1 mi. NW Gouldbusk, dry, TD 2,826 ft., Ellenburger 2,560 ft.

Eastland County: Coast Oil Co. 1 T. L. Brown, G. W. Robinson Sur. 3, 7 mi.

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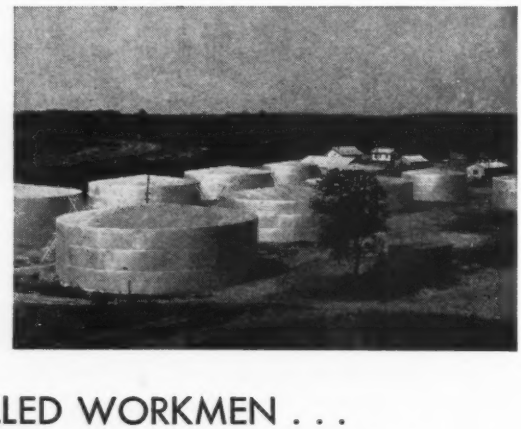

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S Carbon, dry, TD 2,783 ft., swabbed small amount of oil at 2,710-30 ft.

Erath County: Collins & Slaughter 3 J. B. Smith, J. B. Smith Sur., 3 mi. SE of W corner of county, dry, TD 3,240 ft.

Nolan County: Sun Oil Co. 1 Mamie Haney, Sec. 32, Blk. X, T&P Sur., 11½ mi. SW Sweetwater, dry, TD 7,402 ft., anhydrite 1,670 ft., Palo Pinto 5,838 ft., Strawn 6,025 ft., reef lime 6,295 ft., Marble Falls 6,978 ft., Ellenburger 7,295 ft., elev. 2,250 ft.

Throckmorton County: Humble Oil & Refining Co. 1 A. J. Jackson, Sec. 3,047, TE&L Sur., 5 mi. NE Throckmorton, dry, TD 5,178 ft., Caddo 4,240 ft.

Taylor County: Drilling & Exploration Co. 2 J. L. McLean, Sec. 73, Blk. 19, T&P Sur., 1 mi. W Blair, dry, TD 3,910 ft., Flippen 2,839 ft., sand 3,250 ft.

Wise County: Akin & Dimock 1 Gordon T. West, Wm. Mayer Sur., 5 mi. SW Wichita Falls, dry, TD 5,235 ft.

Young County: M. E. Andrews & Associates 1 P. K. Deats, A. Bachell Sur., 3 mi. W Graham, dry, TD 4,908 ft., Caddo 3,859 ft., Marble Falls 4,306 ft., Barnett shale 4,633-52 ft.

R. Clay Underwood 1 B. M. King, J. W. Ross Sur., 4 mi. SW Markley, dry, TD 591 ft.

EASTERN TEXAS

Cherokee Test May Make an Oil Discovery

DALLAS.—Standard Oil Co. of Texas 1 T. E. Acker, Cherokee County wildcat northwest of Maydelle, had promises of a possible oil discovery instead of distillate, after squeezing and reperforating higher in the hole, in the Rodessa. A previous test at 8,660-70 ft. recovered salt water with good distillate odor, and an approximate gas flow of 200,000 cu. ft. daily. The above holes were plugged and the hole drilled out to 8,655 ft. New shots at 8,640-50 ft. were given an 18½-hour drill-stem test, with packer at 8,586 ft. Using 1,020 ft. of water cushion, gas come to the surface in 15 minutes and the recovery was 30 ft. of dark, 48°-gravity oil, 180 ft. of muddy oil-cut brackish water, and 390 ft. of salt water. Maximum surface flowing pressure was 425 psi.

Additional gas was recovered from new shots at 8,610-40 ft. A drill-stem test at 8,610-50 ft. brought gas to the top in 40 minutes, with a maximum surface pressure of 1,100 psi. Gas flowed at the rate of 600,000 cu. ft. daily, with no free oil, distillate or water. The tool was still open on last report.

Humble Oil & Refining Co. 1 E. N. Rylie, Gregorio Ybarbo Survey, 4 miles southeast of Kemp, was drilling in sidetracked hole at 3,050 ft. Total depth was 3,311 ft. in shale before plugging back to 2,900 ft. It was plugged back to straighten the hole.

Ten miles northeast of Carthage, on the edge of the Carthage field, Stanolind Oil & Gas Co. 1 Carthage Gas Unit 7, Sabine River Valley, was blowing out of control at an estimated open flowing pressure of 3,000 psi. The well blew out when operators attempted to run tubing for completion in the upper and lower Pettit gas-distillate zones. At last report, the well had been flowing for three days, and blowing mud and cement out of the hole as fast as it could be pumped in.

EAST TEXAS (DISTRICTS 5 & 6) WILDCAT FAILURE

Cherokee County: Union Producing Co. 1 J. M. Travis, Thomas Quevado Sur., A-44, 6 mi. NE Jacksonville, dry, TD 9,575 ft., flowed gas, oil and salt water from Rodessa perforations at 8,416-23 ft., squeezed, perforated 8,394-8,409 ft., acidized, flowed water, gas and some oil, not commercial, sample tops: Pecan 3,345 ft., Austin 4,383-4,409 ft., Woodbine 4,456 ft., Comanche shale 4,995 ft., lime 5,116 ft., Goodland 6,047 ft., Trinity 6,253 ft., Massive 8,010 ft.

LA.-ARK.

DeSoto Parish Prospect Perforates and Tests

SHREVEPORT.—E. C. Laster 1 Pegues, prospective Rodessa gas-distillate discovery 7 miles northwest of Holly field, 34-15n-14w, DeSoto Parish, sealed perforations at 5,140-50 ft. and 5,190-5,200 ft., which last week flowed a small amount of gas, and perforated again from 5,220-40 ft. with 120 shots. It was acidized with 4,000 gal. and drill-stem tested, which produced a strong flow but had no recovery. With packer at 5,130 ft., it was swabbed in, to flow an estimated 5,000,000 cu. ft. of gas a day, plus a spray of salt water. Distillate yield, if any, was not reported.

In Catahoula Parish, Hunt Oil Co. 5 Louisiana Delta, 23-4n-5e, perforated at 5,834-40 ft., swabbed salt water with a slight show of oil and gas, then squeezed. It drilled out to 5,850 ft., and swabbed 4 bbl. of oil an hour. Operators were waiting on standard rig for further tests. Last week it reported a small amount of oil from perforations at 5,835-45 ft. Total depth was 10,650 ft., plugged back to 6,080 ft., in the Wilcox.

Hunt 1 A. O. Goodwin, Claiborne Parish deep wildcat in 21-23n-7w, was moving in workover rig to reset packer. Packer had been run on tubing to 10,115 ft., after which the well flowed 283 bbl. of oil or distillate. The flow was killed when the packer started leaking. Hunt 1 Peevy, 32-15n-3w, Jackson Parish, was drilling in the lower Glen Rose below 7,801 ft. It cored no shows in shale and lime at 7,387-7,407 ft., and sandy siltstone at 7,423-38 ft.

V. V. Bull 1 Fred Huenefeld, 29-18n-5e, Ouachita Parish, reported shale with oil odor and taste in 14 side-wall cores around 4,747 ft. It drilled ahead below 4,768 ft. The California Co. 1 Brown Paper Mill, 10-6n-3e, new 10,000-ft. wildcat 5 miles south of Monroe, was drilling in James lime below 5,660 ft. It had the Massive anhydrite from 4,564-4,756 ft., on elevation of 106 ft.

In Webster Parish, Hunt 1 R. P. Campbell, 14-23n-10w, was drilling ahead below 11,269 ft. Stanolind and Continental 1 Viola Mitchell, 31-23n-9w, flowed 3,200,000 cu. ft. of gas a day on ¼-in. chokes, with tubing pressure of 2,000 psi., and shut-in pressure of 4,350 psi.

In Ashley County, Arkansas, Superior Oil Co. of California 2 Bradley was below 4,400 ft. in the Cotton Valley. It is a north offset to the company's 1 Bradley, 11-19s-10w, discovery of Felsenthal field.

McAlester Fuel Co. 1-A Polk, 19-15s-20w, was a failure for the new College Hill field of Columbia County. Total depth was 6,477 ft., 5 ft. into the Smackover Electrical surveys revealed no shows of oil or gas. G. H. Vaughn 1 Dennis, 7-16s-21w, cored slightly porous lime, bleeding oil, at 7,216-21 ft. A drill-stem test from 7,200-30 ft., open 13 minutes when the packer failed, recovered 325 ft. of oil and gas-cut mud.

Stanolind Oil & Gas Co. 1 Bodcaw, 29-19s-23w, Lafayette County, was drilling ahead below 11,308 ft. in the Smackover. Stanolind 1 Union Saw Mill, 18-19s-24w, was coring sandy siltstone below 10,915 ft.

NORTH LOUISIANA WILDCAT FAILURES

Caddo Parish: Chicago Corp. 1 Caddo Levee Board, NE SW NW 15-22n-15w, dry, TD 5,560 ft., Massive anhydrite 3,847-4,083 ft., Gloyd 4,327 ft., Hill 4,180 ft., Pettit porosity 5,018 ft., Travis Peak 5,164 ft., elev. 191 ft.

Claiborne Parish: Delta Drilling Co. 1 J. T. Meadows, SW SW 1-22n-7w, dry, TD 10,711 ft.

Grant Parish: R. W. Martin, Jr., 1 Colfax Lumber, SE SE 36-8n-4w, dry, TD 4,610 ft., Wilcox 2,123 ft., elev. 149 ft.

Sabine Parish: Arkansas Fuel Co. 1 Jackson & Purswell, SE NE 29-7n-12, dry, TD 6,210 ft.

ARKANSAS SUCCESSFUL WILDCAT

Ashley County: Superior Oil Co. of California 1 Bradley Lumber Co., NE NE

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11-19s-10w, pumped 53 bbl. 22.8°-gravity oil a day, perforated Cotton Valley 5,874-80 ft., TD 6,173 ft., PB 5,940 ft., Felsenthal field discovery.

ARKANSAS WILDCAT FAILURE

Sevier County: H. H. Vaughn 1 F. B. Gilliam, NW NW 24-9s-30w, dry, TD 995 ft.

TEXAS GULF COAST

New Oil Strike for Wharton County

HOUSTON. — A new oil discovery in Wharton County, ½ mile west of Louise townsite, in I.R.R. company survey, has been completed at Sam G. Harrison 2 H. P. Stockton. Drilled to a total depth of 4,086¼ ft., with sand topped at 4,075 ft., the well flowed an initial production of 35.75 bbl. of oil per day through a 5/64-in. choke, through perforations at 4,077½-80 ft. Flowing pressure on tubing was 775 psi., casing pressure 1,290 psi. Gravity 24.1°.

Humble Oil & Refining Co. 1 Wm. Rice Institute, in Arthur Hutchins Survey, 8 miles northeast of Warren townsite, in Tyler County, opened new gas-condensate production for the East Hillister field. Total depth is 10,000 ft., with top of sand at 8,260 ft. Initial production was 2,080,000 cu. ft. gas per day through 3/16-in. choke, and 78 bbl. condensate per day, ratio 26,700 cu. ft. Open flow calculation is 16,400,000 cu. ft. gas per day, gravity of condensate 59°. Production is through perforations at 8,260-70 ft.

Magnolia Petroleum Co. 1 Maxine Means, wildcat discovery prospect in Live Oak County, is preparing to perforate at 8,820-25 ft. for final completion as a gas-condensate well. The well previously tested an estimated 30,000,000 cu. ft. gas per day on open flow through perforations at that level, gas-condensate ratio of 36,700 cu. ft. Gravity of the condensate is 51.5° and the well flowed 31.9 bbl. of the condensate plus 1,170,000 cu. ft. of gas in 12½ hours through ¼-in. choke, with 1,949 psi. working pressure on a production test. This well is in Simmons Farm Tracts, ACH&B Survey 157, 7 miles south of Simmons City, and 3½ miles east of San Caja field.

Commercial gas-condensate production has been indicated in a flow test of Amerada Petroleum Corp. 1 R. F. Irby, wildcat test in Goliad County, approximately 9 miles west of Goliad townsite. The well flowed gas, condensate, and a little salt water with no gage through perforations at 9,256-64 ft. Total depth is 9,756 ft. This well is in M. J. Ybarbo Grant.

The 57 new locations for Districts 2 and 3 included 16 wildcat starts, 4 in Harris, 2 in Refugio, and 1 each in Brazoria, Calhoun, Chambers, Goliad, Live Oak, Madison, Matagorda, San Jacinto, Victoria and Wharton counties. Four successful exploratory tests were completed, 1 each in DeWitt, Jasper, Tyler, and Wharton counties. Ten wildcats were dry, 2 in Chambers, and 1 each in DeWitt, Harris, Jefferson, Karnes, Live Oak, Montgomery, Victoria, and Wharton counties.

TEXAS GULF COAST (DISTRICTS 2 & 3) SUCCESSFUL WILDCATS

DeWitt County: New gas-condensate discovery—Western Natural Gas Co. 1 Ed Zengerlie et al, in James Quinn Survey, 3 mi. SE of Arneckville, top pay 8,158 ft., TD 8,702 ft., perf. 8,158-68 ft., IP: 3,000,000 cu. ft. gas per day through a ¼-in. choke, plus 95 bbl. per day condensate, ratio 41,000 cu. ft.

Jasper County: New oil discovery, Bunt field—Placid Oil Co. 1 J. S. Richardson Hrs., in Wm. Weiss Survey, 3½ mi. W of Bessmay, TD 8,350 ft., top pay 7,459 ft., Yegua sand, perf. 7,459-69 ft., and 7,477-82 ft., IP: 154 bbl. oil per day through 10/64-in. choke, GOR 5,370 cu. ft., gravity 45°.

Tyler County: New gas-condensate discov-

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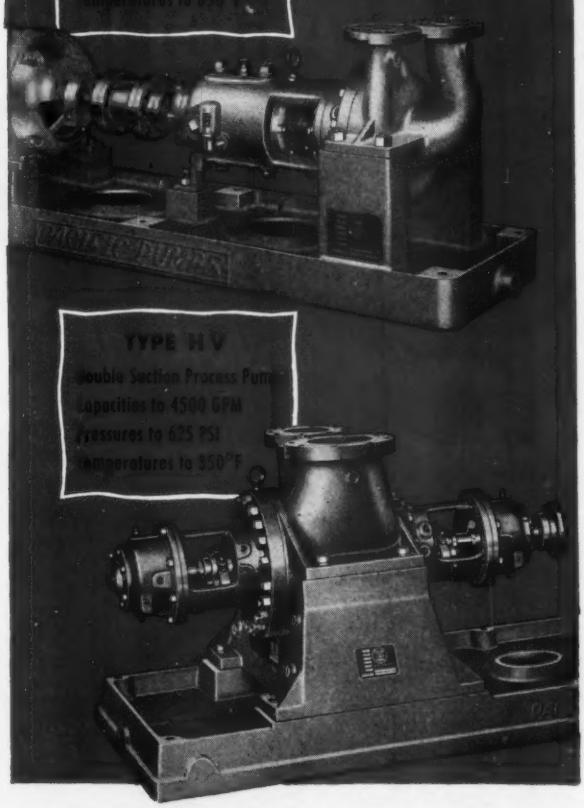

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ery, East Hillister—Humble Oil & Refg. Co. 1 Wm. Rice Institute, in Arthur Hutchins Sur., 8.1 mi. NE of Warren townsite, TD 10,000 ft., top sand 8,260 ft., perf. 8,260-70 ft., IP: 2,080,000 cu. ft. gas per day through 3/16-in. choke, and 78 bbl. condensate per day, GOR 26,700 cu. ft. Open flow calculation 16,400,000 cu. ft. gas per day, gravity 59°.

Wharton County: New oil pool, West Louise—Sam G. Harrison 2 H. P. Stockton, IRR Co. Sur., Abst. 260, ½ mi. NW of Louise townsite, TD 4,086 ft., top sand 4,075 ft., perf. 4,077-80 ft., IP: 36 bbl. oil per day through 5/64-in. choke, GOR 1,260 cu. ft., TP 775 psi., CP 1,290 psi., gravity 24.1°.

TEXAS GULF COAST (DISTRICTS 2 & 3) WILDCAT FAILURES

Chambers County: Jergins Oil Co. 1 E. H. Flewellen et al, in Benj. Winfree Sur., A-28, approx. 1½ mi. SW of Cotton Lake production, dry, TD 8,010 ft.

Chambers County: Phillips Pet. Co. 1 Daw, in Wm. Moore Sur., A-184, 1½ mi. S of Robinson Lake, dry, TD 9,447 ft.

DeWitt County: Continental Oil Co. 1 F. C. Koehler, in Sam S. Petts Sur., A-81, 2 mi. N-NE of Myersville, dry, TD 8,045 ft.

Harris County: Cam Corp. 1 E. H. Hassler, in Jas. Cooper Sur., 7 mi. W of Spring townsite, dry, TD 7,512 ft.

Jefferson County: Placid Oil Co. 1 John Wilfert et al, in T&NO Sur., Sec. 149, 2½ mi. W-NW of LaBelle production, dry, TD 9,710 ft.

Karnes County: Coast Co. 1 Mary Alma Grosse Yates et al, in John Stitz Sur. 2, 4 mi. E-SE of Runge, dry, TD 8,325 ft.

Live Oak County: W. Earl Rowe & P. R. Rutherford 1 Earl M. Baker, TCRR Co. Sur. 387, 3 mi. W of Clegg, dry, TD 3,505 ft.

Montgomery County: Humble O. & R. Co. 1 O. C. Cox et al, in L.M.H. Washington Sur., 3 mi. SW of Conroe townsite, dry, TD 9,526 ft.

Victoria County: Pontiac Refg. Corp. 1-A Frank C. Bowman, in Desidero Garcia Lge., 3 mi. NW of Bloomington, dry, TD 6,435 ft.

Wharton County: Hassie Hunt, Tr. 1 L. E. Locke et al Unit 1, in S. A. Larche Sur., block adjoining town of Magnet on NE side, Lot 4, Blk. 23, re-sub. of Missouri-Lincoln Tr. Co., dry, TD 7,522 ft.

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CANADIAN FIELDS

New Tests Slated NW And West of Woodbend

CALGARY.—Devon-Leduc Oils, Ltd., is starting immediately on a two well program involving an offset to D3 zone production at Leduc, and a wildcat on the Stony Plain Indian Reserve about 3½ miles northwest of Woodbend production.

The first test, a wildcat located in LSD 2, 5-53-26w4, Devon-Leduc-Stony Plain No. 1 is 3½ miles north and a mile west of Imperial Oil's Woodbend producers. Rig will be moved in to start work at this new venture very shortly. Following completion of the Stony Plain well, the company will commence drilling at Devon-Leduc No. 1, LSD 15, 25-50-26w4, ¼ mile due east of Central-Gas & Oil Products No. 1, high-logging D3 zone producer in the northeast fringe of the field. The Leduc offset is regarded as a good prospect for production, while the Stony Plain test is a rank wildcat.

Imperial Oil, Ltd., has staked two new locations for wildcat drilling in Alberta. The first new venture, Imperial-Schoepp No. 1, LSD 9, 22-51-27w4, is located about 5 miles west of the Woodbend oil field and about 7½ miles northwest of the Leduc oil field. The second test, Imperial-Riverbend No. 1, LSD 4, 22-54-23w4, will be drilled about 7 miles northeast of Edmonton, and near center of the 50-mile stretch between Leduc and Redwater. Rigging up is currently under way at both new ventures, and drilling will commence shortly.

Calmont Oils, Ltd., and its subsidiary, Calmont Leduc Oils, on a farmout agreement with Imperial, will drill a well in the Cooking Lake area about 27 miles due east of the Leduc-Woodbend oil fields. The well, Calmont-Leduc No. 3, LSD 4, 14-51-21w4, is located on a seismograph anomaly about 20 miles southeast of Edmonton. Objectives at this test will be the Cretaceous and Devonian horizons which are productive at Leduc. Rig is now being moved in, and spudding is slated for about December 1.

California-Standard's Taber-Province No. 77-1A, LSD 13, 1-9-17w4, has plugged back from 2,254-2,260 ft., after drilling to a total depth of 3,315 ft. Seven-inch casing has been set at 2,254 ft. and the well will be completed as a gasser in the Bow Island. During a drill-stem test in the Bow Island horizon, there was an estimated natural gas flow rate of 3,500,000 cu. ft. daily.

The Consumers' Exploration Co. Princess No. 2 well, SE LSD 2, 8-19-11w4, has drilled to a total depth of 3,317, and ran 7-in. casing to 3,314 ft., after recovering 540 ft. of oil and 47,500 cu. ft. or gas on a 1-hour drill-stem test. The test was made at 3,307-17 ft., after topping the lime at 3,314 ft. Crew is now preparing to drill out plug at No. 2, while the No. 1 Princess well, LSD 2, 8-19-11w4, total depth 3,322 ft., has been acidized and is now swabbing.

The Blackfoot Devonian Syndicate Test No. 1, LSD 12, 15-20-2w4, in the Blackfoot section of the Lloydminster oil field, has plugged back and will take production from the Sparky sand. The hole was drilled to a total depth of 3,415 ft., and a column of salt and salt stringers were found in the limestone from 3,325 ft. to bottom 3,415 ft. A 35-sack cement plug was set from

2,292-2,460 ft. before taking production from the Sparky sand horizon that had previously given a good showing.

Leduc. — Calmont-Leduc No. 2, LSD 6, 1-51-26w4, about ⅝ of a mile north of Leduc D3 production, cored to a depth of about 5,302 ft., which is the indicated water line, and was still in the green shale. After running an electrolog to determine possibilities of Lower Cretaceous production, the decision to plug and abandon the Calmont well was made. The green shale had been topped at 5,105 ft., K.B. elevation at the well is 2,280 ft.

KANSAS

Stafford County Wildcat Is Probable Pool Opener

HINKLE OIL CO. 1 Copeland, NE NE NE 30-24s-20w, Stafford County, is going on pump after swabbing 7 bbl. of oil per hour through perforations opposite the Lansing-Kansas City at 3,752-60 ft. The well had a show of oil in the Arbuckle on drill-stem test and from the first perforations in the Arbuckle at 4,160-72 ft. but production here soon went to water. When other perforations low in the Kansas City also produced mostly water the well was plugged back to 3,775 ft. and made the above swabbing after treatments with 2,000 gal. and 5,000 gal. of acid. The Lansing was called at 3,591 ft. and the Arbuckle at 4,165 ft. The well is located a little more than 1 mile southwest of Van Lieu pool.

Carter Oil Co. has staked another Nemaha County wildcat at 1 Kesler, NW NW NE 14-1s-14e, about 8 miles north of the recently discovered Hunton lime pool that was opened by Carter 1 Strahm, SW SW NW 27-2s-14e, with a pumping potential of 50 bbl. per day.

H. H. Blair opened a new pay for Southwest Burnett pool with completion of 5-A Opdyke, SE SW SE 15-11s-18w, Ellis County. Production of 345 bbl. daily is from the Topeka lime at a plugged back depth of 3,225 ft. Other production in the pool is from the Lansing-Kansas City and Arbuckle.

Butler County has a discovery well at Shawver-Graham, Inc. et al 1 Guyot, NE NE SE 5-29s-5e, 3 miles west of Fox-Bush pool. The well has been completed for a rating of 80 bbl. per day from Bartlesville sand at 2,795-2,804 ft.

KANSAS SUCCESSFUL WILDCATS

Butler County: Shawver-Graham 1 Guyot, NE NE SE 5-29s-5e, pumped 30 bbl. of oil per day from Bartlesville at 2,796-2,804 ft., TD.

Ellis County: V. D. Sidey 1 Polifka, NW SE SE 7-13s-17w, pumped 127 bbl. of oil from Arbuckle at 3,640-71 ft.; Lansing 3,385 ft., TD 3,671 ft.

Harvey County: National Cooperative Refinery Assn. 1 Schmidt, NW NW NE 31-22s-3w, pumped 50 bbl. of oil per day from Mississippian 3,265-75 ft., TD 3,301 ft.

KANSAS WILDCAT FAILURES

Barton County: Amerada Petroleum Corp. 1 Russell, SE SE NW 24-19s-15w, dry, TD 3,659 ft., Lansing 3,228 ft., shaly conglomerate 3,496 ft., cherty conglomerate 3,511 ft., Arbuckle 3,542 ft., Lamotte 3,641 ft., granite 3,651 ft.

Flournoy-Williams 1 Sullivan, NW NW SE 29-17s-13w, dry, TD 3,390 ft., anhydrite 805 ft., Heebner 3,005 ft., Lansing 3,117 ft., Arbuckle 3,340 ft.

Butler County: Kaiser Pipe & Supply Co. 1 Stein, NW NE NW 25-27s-6e, dry, TD 3,209 ft., Lansing 1,780 ft., Kansas City 2,101 ft., Mississippi lime 2,780 ft., Mississippi 2,770 ft., basal Mississippian 3,130 ft., Simpson dolomite 3,198 ft.

D. S. Hager and Federal Royalty Co. 1 Johnson, SW NW NW 17-26s-7e, dry, TD 3,175 ft., Lansing 1,763 ft., Kansas City 2,075 ft., Mississippian 2,724 ft., Viola 3,101 ft., Simpson 3,119 ft., Arbuckle 3,170 ft.

Bennett & Roberts Drilling Co. 1 Meiman, NW NW SE 9-25s-3e, dry, TD 2,772 ft., Mississippian 2,757 ft.

Cowley County: Kingery & Patterson 1 Shepard, SE NE SE 2-35s-6e, dry, TD 3,034 ft., Mississippian 2,990 ft.

Dickinson County: National Cooperative Refinery Assn. 1 Biehler, NE SE SW 29-16s-4e, dry, TD 2,390 ft., Lansing 1,765 ft., Mississippian 2,338 ft.

Graham County: The Texas Co. 1 Lindermann, NE NE SE 5-7s-25w, dry, TD 4,322 ft., anhydrite 2,150 ft. Topeka 3,436 ft., Heebner 3,641 ft., Lansing 3,681 ft., cherty conglomerate 4,124 ft., Arbuckle 4,174 ft.

Ness County: Mid-States Oil Co. et al 1 McCreight, SE SE SW 10-20s-23w, dry, TD 4,500 ft., Lansing 2,779 ft., conglomerate 3,995 ft., Mississippian 4,445 ft.

Pawnee County: Mid-Continent 1 Fox, SE SE NE 32-20s-16w, dry, TD 3,870 ft., anhydrite 1,059 ft., Lansing 3,470 ft., Simpson sand 3,751 ft., Arbuckle 3,813 ft.

Pratt County: The Texas Co. 1 Quinn, NW NW NW 4-28s-14w, dry, TD 4,474 ft., Ft. Riley 2,403 ft., basal Florence 2,490 ft., Lansing 3,956 ft., conglomerate 4,390 ft., Mississippian 4,432 ft., Kinderhook shale 4,450 ft., Kinderhook sand 4,465 ft., Viola 4,480 ft., Simpson 4,568 ft., Arbuckle 4,698 ft.

Rice County: Elreco and E. H. Adair 1 Mooney, SW SW SW 5-19s-10w, dry, TD 3,375 ft., Heebner 2,864 ft., Lansing 3,003 ft., Arbuckle 3,345 ft.

Rooks County: M. B. Armer 1 McCormick, SE SE NW 7-8s-19w, dry, TD 3,462 ft., Dakota 925 ft., anhydrite 1,435 ft., Heebner 3,125 ft., Lansing 3,146 ft., Arbuckle 3,421 ft.

Sam Pack 1 Bogart, NE NE NW 21-7s-20w, dry, TD 3,658 ft., Lansing 3,351 ft., Arbuckle 3,587 ft.

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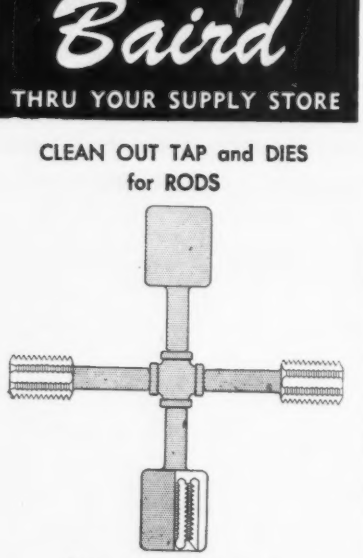
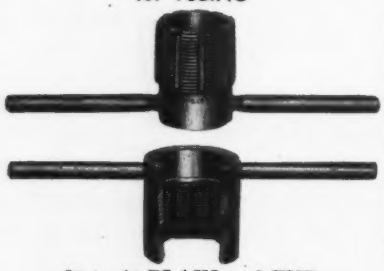


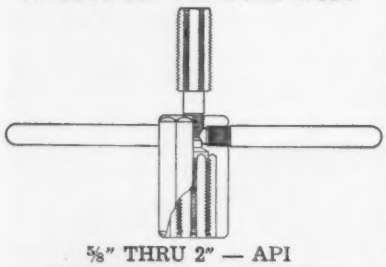
⅝" — ¾" — ⅞" — 1"

CLEAN OUT TAP and DIES for TUBING



2" to 4" PLAIN and EUE ROUND and V-THREAD

CLEAN OUT TAP and DIES for BLOWOUT PREVENTER STUDS



⅝" THRU 2" — API

Patent No. 2110618

BAIRD MFG. CO.—TULSA

Stafford County: J. M. Huber and Harbar Drilling 1 Mann, NW NW NW 21-23s-14w, dry, TD 4,092 ft., Heebner 3,432 ft., Toronto 3,451 ft., basal Oread 3,469 ft., Lansing 3,588 ft., conglomerate 3,889 ft., Viola 3,902 ft., Simpson 4,000 ft., Simpson dolomite 4,013 ft., Arbuckle 4,053 ft.

Wabaunsee County: Amerada Petroleum Corp. 1 Enlow, SE SE SE 4-11s-10e, dry, stratigraphic test, no TD or tops reported.

Woodson County: Robinson 1 Adamson, SE SE NE 26-26s-14e, dry, TD 1,510 ft., Bartlesville 1,493 ft.

Charles Baker et al 1 Weide, NE SE NE 10-24s-14e, dry, TD 1,710 ft., Mississippi lime 1,630 ft.

ROCKY MOUNTAIN

Stanolind Tests Block In Big Horn Basin

DENVER.—A wildcat that may mean considerable future drilling on the northwest side of Wyoming's Big Horn basin is Stanolind Oil & Gas Co. 1 Unit, C SE NE 8-55n-100w, in the Big Sand Coulee area, Park County, Wyoming. Stanolind is now below 13,000 ft. on this well, possibly in the Tensleep formation. The well topped the Dinwoody at 12,895 ft. This well is based on seismic exploration by Stanolind several years ago in the general area southwest of Elk Basin field and north of the Oregon basin fields and in the northwest section of the Big Horn basin. There is particular interest in this test because of its location south of the recently discovered Silver Tip field which produces oil from the Frontier and Phosphoria formation.

Seaboard Oil Co. made the Silver Tip discovery early this year and now has three completions in the Phosphoria and five oil producers in the Frontier sand. In the deep tests in this field, Seaboard produced Tensleep oil from one of the wells but found that formation hard and tight in the other two. Tensleep at Silver Tip is at approximately 9,000 ft. No report has been made of saturation at the deep Stanolind Big Sand Coulee wildcat, although drill-stem tests have shown slightly oil-cut mud in the Frontier. If a discovery is made in this field, it is expected that several other wildcats will be drilled on seismic blocks in this general area.

Saturation has been logged by Wilshire Oil Co. and Atlantic Refining Co. at their 1 Fourbear, C NE NE 31-48n-103w, in the West Fourbear area, Park County, Wyoming. The well topped the Dinwoody at 4,290 ft. and is now reported below 4,550 ft., probably in the Tensleep. On drill-stem test between 4,422-73 ft., the well made some oil with thin watery mud. Saturation was logged between 4,340-48 ft. Location is 2 miles southwest of Fourbear field, which has three wells completed in the Tensleep formation.

With the increasing interest in wildcat drilling in Utah, attention is now focused on Amerada Petroleum Corp. 1 Unit, SE NW NW 2-22s-16e, in Green River area, Grand County, Utah. This well has been at 5,645 ft., total depth, for the last 3 weeks, and the operator is now cementing reportedly in an effort to seal off gas zones possibly below the Paradox. The well is carried as a tight hole, and the operator has not released formation tops nor tests. It is reported from Salt Lake City that considerable flow of gas has been encountered at the present depth of the well and that the well is making some condensate.

This well was originally projected as a test below the Paradox soft formation. Due to its location on the northwest side of Utah's Salt basin, it is of considerable interest. Previous tests in this basin, none of which were drilled below the Paradox, found strong flows of both oil and gas, none proving commercial after lengthy testing. Leasing has been very active in this basin, and it is now estimated that well in excess of 1,000,000 acres of leases are held by a number of operators.

The Texas Co. is now completing its new pay discovery in Big Wall field, Musselshell County, Montana. The 1 Zoerb, SE NW SE 18-10n-27e, found oil in the lower Amsden sand and was drilled through the Kibbey to 3,617 ft., total depth. After shows in the Kibbey did not prove encouraging, the well was plugged back to 2,824 ft. and is now flowing approximately 70 bbl. oil per day through a 12/64-in. choke. The casing was perforated opposite the sand be-

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tween 2,815-20 ft., and it is probable that Texas will continue perforating and squeezing in an effort to shut off water now being produced with the oil. This is the first oil discovery in this zone in the central Montana area. Texas' first well at Big Wall made a small producer in the Kibbey. A second well was dry in that formation. The present test is located higher structurally than the other two wells but is still not commercial in the Kibbey zone.

It is reported from Casper, but not confirmed, that Pure Oil Co. may have a new producing formation in its deep West Poison Spider field. The company is now drilling the second well on this structure, and at around 9,000 ft. on tests of the sand in the Mesa Verde (upper Cretaceous) the well is reported to be making approximately 25 bbl. of oil hourly. Pure's first well on this structure, completed early this year, is the deepest producing well in the world. The well was completed producing from 899 bbl. of oil daily through choke.

There was no report of saturation in the Mesa Verde in the first well. The second well is a ½-mile northwest extension. Pure seismographed this block prior to drilling, and completion of its discovery was rated of major importance at the time the well was completed. Pure now has a similar block which it is unitizing 20 miles northwest of West Poison Spider. Although shows of oil have been found in the Mesa Verde throughout Wyoming, there are no commercial fields producing from this formation.

WYOMING WILDCAT FAILURES

Shirley Dome, Carbon County: Phillips and Kerr-McGee 1 Unit, NE NE SW 11-26n-81w, TD 3,676 ft., dry, Muddy 920 ft., Dakota 994 ft., Lakota 1,050 ft., Morrison 1,100 ft., Sundance 1,360 ft., Alcova 3,140 ft., Madison 3,240 ft., Deadwood 3,520 ft., granite 3,645 ft., elev. 7,040 ft. KB.

Moorcroft, Crook County: Buffalo Drilling 1 Jones, C SW SW 33-52n-67w, TD 2,195 ft., dry, Sundance 800 ft., Spearfish 880 ft., Minnekahta 1,490 ft., Opeche 1,530 ft., Minnelusa 1,563 ft.

Monument Butte, Sweetwater County: McCarthy Gas & Oil, Inc., 28-1, NE NE SE 28-26n-111w, TD 4,002 ft., PB 2,284 ft., dry.

COLORADO WILDCAT FAILURE

Round Butte, Larimer County: C. D. Cunningham 1 State, NW NW SE 6-11n-68w, TD 1,919, PB 1,470 ft., dry, Muddy 1,384 ft., Dakota 1,547 ft., Lakota 1,642 ft., Sundance 1,912 ft.

MONTANA WILDCAT FAILURE

Chester area, Liberty County: G. S. Frary 1 Zorn, C SW SW 12-33n-6e, TD 3,227 ft., dry, Colorado 970 ft., Blackleaf 1,755 ft., Kootenai 2,935 ft., Ribbon 3,015 ft., Madison 3,209 ft., elev. 3,503 ft. RB.

UTAH SUCCESSFUL WILDCAT

Boundary Butte, San Juan County: Western Natural Gas Byrd-Frost et al 2 English, SE SE NW 22-43s-22e, TD 1,514 ft. in Coconino, pumped 52½ bbl. of oil in 13¼ hours, 7-in. casing at 1,492 ft., Coconino 1,490 ft.

MISSISSIPPI

New Pool Opened in Franklin County

JACKSON.—H. L. Hunt 1 W. L. Graves, 29-6n-2e, potential new discovery in Franklin County, has been shut in while tanks and separator are being erected. On a drill-stem test through perforations at 10,578-85 ft. well flowed an estimated 150 bbl. of oil, 44.3° gravity, with tubing pressure 2,820 psi. Final testing is scheduled for next week.

In the Carthage Point field of Adams County, The Pure Oil Co. 1 Interstate Coffee Co., 13-6n-3w, was completed flowing 92 bbl. of condensate plus 900,000 cu. ft. of gas per day, through a 10/64-in. choke, tubing pressure 2,200 psi. Gravity is 49°. Total depth is 10,274 ft., with production through perforations at 10,262-68 ft.

In La Grange field, Adams County, Herbert Herff 1 Wilson Estate, 7-6n-2w, was completed flowing 160 bbl. per day through 10/64-in. choke, tubing pressure 375 psi. Total depth is 6,315 ft., with perforations at 6,264-67 ft.

Kemp Drilling Co. 1 E. B. Ogden, 42-6n-2w, in the La Grange field, South, Adams County, was drilled to a total depth of 6,450 ft., and was completed for an initial production of 300 bbl. of 44°-gravity oil through an 11/64-in. choke. Perforations are at 6,385-89 ft.

In the Yellow Creek field of Wayne County, Magnolia Petroleum Co. 2 Mamie West, 23-9n-8w, was completed pumping 48 bbl. oil, plus 12 bbl. of salt water per day, gravity of oil 17.2°. Total depth is 5,217 ft., and perforations at 5,138-48 ft.

Seven wildcat locations were reported for Mississippi, 1 each in Adams, Franklin, Ittawamba, Jefferson, Pike, Scott and Washington counties. Six development wells were reported, 3 in La Grange field, Adams County, and 1 each in Heidelberg-East, and Soso field, Jasper County, and Yellow Creek field in Wayne County. One wildcat failure was completed in George County.

MISSISSIPPI WILDCAT FAILURE

George County: The Ohio Oil Co. 2 Dantzler Lumber Co., 30-3s-8w, dry, TD 5,924 ft.

ALABAMA WILDCAT FAILURES

Mobile County: Humble Oil & Refg. Co. 1 V. E. Mims, 18-1s-1w, dry, TD 9,001 ft.

Sumter County: Harry Elliott 1 Pete Perolio, 29-18n-1e, dry, TD 3,706 ft.

FLORIDA WILDCAT FAILURE

Columbia County: Sun Oil Co. 1 M. W. Sapp, 24-2s-16e, dry, TD 3,303 ft.

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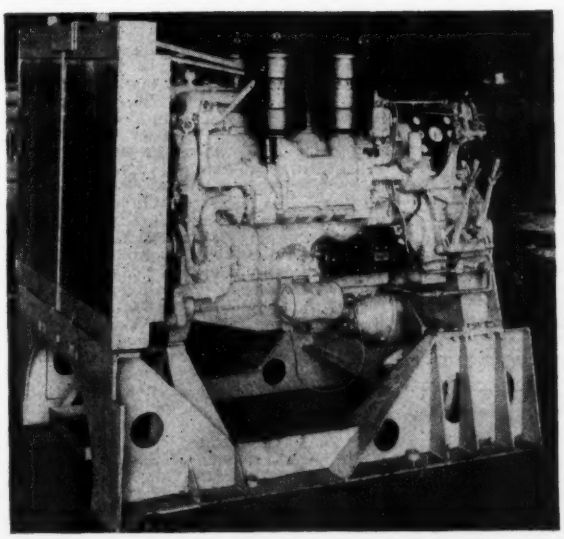

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OKLAHOMA

Another Beckham County Well Has Good Oil Show

UNION PRODUCING CO. 1-A Music, C NE SW 24-10n-21w, Beckham County, had a recovery of 1,800 ft. of 49°-gravity oil and 200 ft. of oil and gas-cut mud on a drill-stem test at 8,904-24 ft. with tool open for 30 minutes. The test had gas in 3 minutes and oil started to flow as the tool was being closed. Another test at 8,924-40 ft. with tool open for 29 minutes recovered 2,365 ft. of oil and 455 ft. of salt water. The well is a little less than 1½ miles southeast of the Elk City discovery well and slightly more than ½ mile north of Union 1 G. G. Music where operator found gas and distillate in a granite wash pay at 9,649-62 ft. The oil show at 1-A Music has not thrown too much light on the problem of correlating pay zones in the area since the datum of the oil zone tested figured from an elevation of 1,843 ft. would be —7,061-81 ft. This depth is nearer the upper oil zone at Shell Oil Co. 1 Long, C NE SW 15-10n-21w, than the pays at either the discovery well or Union 1 G. G. Music.

Still another oil show for the area came with the announcement that Shell Oil Co. has the second oil zone at 1 Long, C NE SW 15-10n-21w. A 1-hour drill-stem test at 9,327-67 ft. with ½-in. top and ¼-in. bottom chokes made gas in 25 minutes but did not flow the 1,000-ft. water cushion used. Recovery was 4,500 ft. of oil. In addition to the two shows of oil, this well had gas and distillate just above 9,000 ft.

B. B. Blair is testing at 1 Madgett, NW SW NE 4-10n-6e, Seminole County. The well had recovery of 1,000 ft. of oil and 150 ft. of oil-cut mud on a drill-stem test of the Misener sand at 4,267-75 ft. Casing was set on top of the Misener at 4,265 ft.

Danciger Oil & Refining Co. has a show of gas distillate at 1 DeCordova, NW SE SW 35-8n-3w, McClain County. A drill-stem test of sandy dolomite at 9,346-67 ft. had gas in 1 minute, estimated at 10,000,000 cu. ft., and spray of distillate, estimated at 3½ bbl. per hour. Recovery was 250 ft. of distillate. Casing has been set to total depth of 9,382 ft.

The Texas Co. is testing at 1 Donham, NE NE NW 22-4n-3w, Garvin County, south of Southeast New Hope and west of Southwest Maysville pools. Well made 1 bbl. of 56°-gravity distillate per hour and gas at the rate of 1,800,000 cu. ft. per day through perforations opposite Pennsylvanian sands at 6,789-91 ft. and 6,800-08 ft. Well was drilled to 8,049 ft. and casing set at 8,047 ft.

Gulf Oil Corp. has completed the Grady County wildcat, 1 Mainka, NW NW NE 12-5n-5w, in the Tulip Creek sand at 13,137-13,250 ft. with a completion gage of 464 bbl. of oil and 5,500,000 cu. ft. of gas per day through 11/64-in. choke. The oil is 46° gravity. The well also had shows of oil, gas, and distillate in the Bromide below 12,000 ft.

OKLAHOMA SUCCESSFUL WILDCATS

Garvin County: Carter Oil Co. 1 Yeary-Vaughn, C SE NW 9-1n-1w, flowed 36 bbl. of 61°-gravity distillate with 5,660,000 cu. ft. of gas per day from Hoxbar at 4,729-4,810 ft., TD 7,650 ft.

Magnolia 1 Mason Burns, NW SE NW 34-4n-2w, flowed 419 bbl. of 40°-gravity oil per day from first Bromide sand at 6,249-58 ft., TD 6,280 ft.

McClain County: Steelman 1 Smith, NW SW SE 24-5n-2e, pumped 120 bbl. of 16°-gravity oil per day from Viola at 4,044-70 ft., TD.

Payne County: Callery 1 Blumer, SE NW SE 28-18n-2e, pumped 2 bbl. of oil per day from Skinner at 4,331-41 ft., TD 4,372 ft.

OKLAHOMA WILDCAT FAILURES

Beckham County: Pure 1 Taute, C NW SE 34-10n-25w, dry, TD 8,177 ft. in granite.

Comanche County: Kleeman 1 Rankin, NE NE NW 33-4n-12w, dry, TD 280 ft., no tops reported.

Hughes County: Sunray 1 Woods, NW SW NE 5-5n-8e, dry, TD 2,785 ft., Gilcrease 2,706 ft.

Falcon 1 Hundley, NW NE SW 20-6n-10e, dry, TD 4,486 ft., Senora lime 445 ft., Thurman 838 ft., Bartlesville 1,915 ft., Gilcrease 3,580 ft., lower Gilcrease 3,900 ft., Wapanucka 4,040 ft., Union Valley 4,400 ft., Cromwell 4,445 ft.

Lincoln County: Morgan 1 Williams, NW NW SE 13-16n-2e, dry, TD 5,066 ft., no tops reported.

Love County: Feldman 1 Hamilton, SE SW SE 28-8s-2e, dry, TD 6,421 ft., basal Pennsylvanian and Senora lime 6,160 ft., dolomite 6,255-68 ft. with stain of oil, Arbuckle 6,310 ft.

Seminole County: Hunt 1 Brewer, SE NE SE 1-5n-6e, dry, TD 4,004 ft., Thurman sand 1,950 ft., Union Valley 2,590 ft., Cromwell sand 2,700-80 ft., lower Cromwell sand 2,825 ft., Caney 3,220 ft., Woodford 3,590 ft., Viola 3,740 ft., Simpson dense 3,785 ft., Simpson dolomite 3,840 ft., sandy dolomite 3,920 ft., Wilcox 3,950-4,004 ft.

MICHIGAN

Wildcat Starts in State Stepping Up

SAGINAW.—Spurred by Merrill Drilling Co. Isabella discovery, exploratory drilling in Michigan is on the upgrade again. Of 28 new locations announced in the past week, 15 are wildcats. Meanwhile, Merrill Drilling began on two offsets to its 1 Sheahan which came in a gusher unexpectedly in Section 7, Isabella Township, Isabella County. The discovery was completed in the Dundee at 3,787 ft. Flowing initially at more than 100 bbl. an hour production has been restricted and stabilized to a daily flow of about 170 bbl. Tests revealed the product a high quality crude.

Of 16 completions reported for the week, 7 were producers. Six of the 9 dry holes were wildcats. Two of the producers are in the Beaver Creek field of Crawford County from the 4,450-ft. level, 2 others are Dundee producers in Bay County, one is in Ogemaw and the other in the Pentwater field of Osceola County where Gulf Refining Co. completed its sixth good well on its 80-acre Paulsen lease in Section 7, Weare Township. The 6 Paulsen is the second completion on the lease in the Traverse limestone. It is flowing 100 bbl. a day on proration. The other four Paulsen wells are Dundee producers, in the north Weare Township area.

Six of the 28 new locations are listed by Ashby Drilling Co. for Geneva Township, Van Buren County. Others are: 4 in Oceana, 2 each in Bay, Berrien, Kent and Allegan; one each in Grand Traverse, Mecosta, Livingston, Berrien, Arenac, Ottawa, Rosecommon, Gratiot, and Osceola.

MICHIGAN SUCCESSFUL WILDCAT

Isabella County, Isabella Township: Merrill Drilling Co. 1 Sheahan, SE SW SW 7-15n-4w, flowing 170 bbl., choked, from Dundee. TD 3,787 ft.

MICHIGAN WILDCAT FAILURES

Allegan County, Casco Township: Chapman Oil Co. Cosgrove, NW NW SE 16-1n-16w, dry in Traverse, TD 1,144 ft.

Hopkins Township: Gertsema & Meyer 1 Timmerman, SW SW NE 15-3n-12w, dry in Traverse, TD 1,739 ft.

Overisel Township: Ford Oil Co. 1 Klynstra, NW SE SE 4-4n-14w, dry in Traverse, TD 1,520 ft.

Clinton County, Essex Township: H. Fulton and T. Wyllys 1 Lansing Co., SW NW NW 15-8n-3w, dry in Dundee, TD 2,973 ft.

Montcalm County, Bloomer Township: Mercer Oil Co., Inc., 1 Martin, SW SW NW 6-9n-5w, dry, TD 3,185 ft.

Van Buren County, Geneva Township: V & S Oil Co. 1 Perlman, SE NW SW 32-1s-16w, dry in Traverse, TD 1,020 ft.

CALIFORNIA

New Field Discovery For Newhall Area

LOS ANGELES.—A new oil field discovery in the Newhall area of Los Angeles County appeared to be definitely confirmed last week as the result of tests made at the R. W. Sherman 3-1 Newhall Community, 2-3n-16w. On a 1-hour formation test of the intervals 5,575-95 ft. and 5,635-80 ft., with packer set at 5,560 ft., the well showed considerable gas and, when the tester was pulled, approximately 2,900 ft. of 40°-gravity oil was recovered. This would indicate that oil entered the well at the rate of about 40 bbl. per hour or 960 bbl. per day. This does not necessarily mean that the well will produce 960 bbl. daily when completed, but most scouts familiar with the well are of the opinion that it will produce in excess of 1,000 bbl. daily. Total depth of the well is 5,786 ft., and 7-in. casing, with perforations opposite the zones mentioned above, is cemented at 5,774 ft.

While R. W. Sherman is operator of the well, Signal Oil & Gas Co. and the Walter Buass Drilling Co. each own a one-third interest in the venture. The combination holds about 1,200 acres under lease surrounding the well.

Not too distant from the prospective discovery other small oil wells have been completed in the past, but none of them showed any indication of an accumulation such as the 3-1 Newhall Community has probably uncovered. About a mile to the southwest, Shell Oil Co., Inc., some time ago completed a well good for approximately 20 bbl. daily, while about 1½ miles due south the Tomato Can 1 Perkins was completed for 8 bbl. daily. Both the British-American Oil Producing Co. and Standard Oil Co. of California drilled wells in the area which encountered showings but were of uncommercial value. The British-American well was about ⅓ mile from the 1 Perkins while Standard's test was about ½ mile to the northwest.

Universal Consolidated Oil Co. has abandoned its extension test of the Guijarral Hills field, the 1 Orr, 2-21s-16e, after an electric log showed the prospective productive zone to be barren. The venture, located about 1 mile south of the discovery well of the field, the Barnsdall Oil Co. 1 Fred Smith, cored into a hard tight sand at 9,150 ft. This zone was believed to be the Leda zone which was productive in the discovery, and this indicates that the well ran considerably lower on structure than was expected. Barnsdall's well, which was completed only a few weeks ago to open the first Leda sand production in the State of California, is still the only producing well in the new field. Several other tests are under way, however, and some indications of what the area may yield should become apparent within a few days.

Possibilities of production below the Stephens zone in the Elk Hills field of Kern County apparently will remain a mystery for some time to come. Standard of California has announced that its deep test there, the 326-28R UONPR, 28-30s-23e, reacted negatively on a formation test of the interval 8,931-11,204 ft., total depth. At bottom the bit was in hard shale. Casing is set at 8,931 ft., and Standard will probably plug back and attempt to complete the well in the already-proved Stephens zone.

CALIFORNIA SUCCESSFUL WILDCATS

Los Angeles County, Seal Beach Area: Marine Exploration Co. 2 State, 11-5s-12w, pumped 74 bbl. daily, gravity 26.3°, water cut 2 per cent, elev. 15 ft., TD 12,131 ft.

(Continued on page 173)

OHIO, KENTUCKY

NE Extension for Perryton Oil Pool

COLUMBUS.—Allen Willey et al 1 extended the Perryton pool nearly ½ mile to the east and north with what is showing for the best of the recent completions. Their 1 J. W. Ridgeway, Lot 15, Jackson Township, Muskingum County, County, flowed and swabbed 86 bbl. natural while drilling in. No sand measurements or shot reports have come in yet.

B. H. Putman et al found gas in their wildcat on M. A. Hall in Section 10, Olive Township, Meigs County. Berea sand at 2,017-21 ft. showed 145,000 cu. ft. natural and 202,000 cu. ft. with 800 psi. rock pressure when shut in after shot. The test is 6 miles from production.

The Frank Brendel O. & G. Co. completed its third and smallest well in southwest Laurence Township, Tuscarawas County, the 1 L. C. Streb, Section 24. Red Clinton at 4,659-94 ft. made 150,000 cu. ft. natural and 430,000 cu. ft. in 16 hours after shot.

The Rock Ridge Development 2 Goldie Payer, Lot 41, Parma Township, Cuyahoga County, found the Oriskany at 1,699-1,750 ft. with 450,000 cu. ft. natural. The well will be finished and tubed at this depth.

The Chartiers Oil has drilled past the Oriskany horizon without finding any sand in its wildcat on J. T. Leach, Section 20, Highland Township, Muskingum County. The test will finish in the Clinton or Medina.

Perry County continues to lead in drilling activity with six new locations for the week. Twelve other counties reported an additional 20 locations. Completions were up again with a total of 31. Ashland field led with 8, while Lancaster and Mt. Vernon had 5 each.

OHIO WILDCAT FAILURE

Tuscarawas County, Goshen Township: Benedum-Trees 1 Fred Rufenacht, 1st Qr., Clinton 4,726-4,832 ft., dry, TD 5,027 ft.

EASTERN KENTUCKY

ASHLAND.—Ashland Oil & Refining Co. has announced location for a deep test on Laurel Creek Dome of the Paint Creek Uplift. Location is in 19-R-79 slightly south of town of Redbush and 12 miles airline northwest of Paintsville. Knox dolomite formations will be tested.

In northern Powell County, 4-Q-65, Roy Davis at his 2 George Reddix is getting ready to run casing at total depth 2,723 ft. in the Knox dolomite topped at 2,135 ft. Top of St. Peter sand was had at 2,086 ft. with a hole full of water at 2,105 ft. Casing is being run to shut off water before drilling to deeper sands.

Kentucky-West Virginia Gas Co. completed a very good gas well on Lawyer Scott farm in the Big Sandy gas field on Burning Fork in Pike County. Gas gaged 3,670,000 cu. ft. daily from 2,905 to 3,160 ft. from the Devonian black shale. Rock pressure was reported at 430 psi. and the well was not shot.

WESTERN KENTUCKY

OWENSBORO.—J. C. Miller and Ashland Oil & Refining Co. continue testing the Cypress at 1 J. D. Bennett, NW SW SW 6-N-27, McLean County. The well made 531 bbl. on a 56-hour pump test of the Cypress at 1,970-82 ft. and was reported to be pumping 8 bbl. per hour at the end of the test. The well is about 12 miles southwest of Owensboro and just northwest of a recently completed dry hole, W. E. Hupp et al 1 A. Bunch, SW SE SW of the same section. The Bunch well was drilled to 2,094 ft. from an elevation of 395 ft. compared with the pay top in the Bennett well, called at 1,970 ft. from an elevation of 459 ft.

In Webster County, I. B. Browning and Ashland Oil & Refining Co. 1 J. F. Wootten, 6-L-24, is drilling below 3,153 ft. after a slight show of oil in the Tar Springs at 2,884-2,983 ft. A 1-hour drill-stem test at 2,905-09 ft. recovered a show of oil and 20 ft. of mud.

In the Poole area of northern Webster County, I. B. Browning has completed 4 D. B. Pruett, 9-N-23, with an initial production of 104 bbl. daily from the McClosky at 2,602-08 ft.

The summary of drilling operations and completions for October, discussion and comparison between 10-month cumulative figures for 1948 and 1947 will appear next week.

WESTERN KENTUCKY SUCCESSFUL WILDCAT

Henderson County: Ashland Oil & Refining Co. and Basin Drilling Co. 1 C. M. Crafton, NW SE SE 1-O-25, IP 50 bbl., Hardinsburg 1,735-42 ft., TD 1,754 ft. (Discovery well for North Euterpe pool.)

INDIANA

EVANSVILLE.—The extreme southwestern part of Knox County has a good well in the Mount Carmel area at S. D. Jarvis 3 Stillwell-Holsen, SE SE NW 13-1s-12w, with production from the Hardinsburg at 1,808-30 ft. The well flowed 26 bbl. per hour through ½-in. choke and is flowing 11 bbl. per hour through ¼-in. choke. Jarvis completed 1 Stillwell-Holsen earlier this month for 135 bbl. per day from the Benoist at 2,075-89 ft.

Superior Oil Co. 2 Ora Smith, SW NW NE 23-3s-12w, Gibson County, between Owensville and Fleener pools, filled with

(Continued on page 174)

ILLINOIS

Clay County Wildcat Flows From O'Hara

MATTOON.—In the area about 4 miles northwest of the town of Louisville in Clay County, J. L. Black 1 Edward Hammer, SW NE SW 5-4n-6e, has been shut in for tanks after flowing at an estimated rate of 12 bbl. per hour from the O'Hara at 2,733-45 ft. Casing was set on top of the pay and hole was drilled to 2,760 ft. The well is about 1 mile northeast of Russell.

Clay County also had one of the better well completions for the week at Sohio Petroleum Co. 1 C. Heitman, NW SW NW 5-5n-7e, Bible Grove area. The well was completed in the Rosiclare at 2,801-08 ft. with an initial production of 573 bbl. per day.

In Christian County, National Associated Petroleum Co. is pump testing the Devonian at the wildcat 1 John C. Lawrence, SE NE SE 9-13n-1e. Total depth is 2,330 ft.

About 2 miles southwest of Akin pool in Franklin County, J. W. Menhall is running a drill-stem test on the McClosky at 3,163-67 ft. following a show of oil.

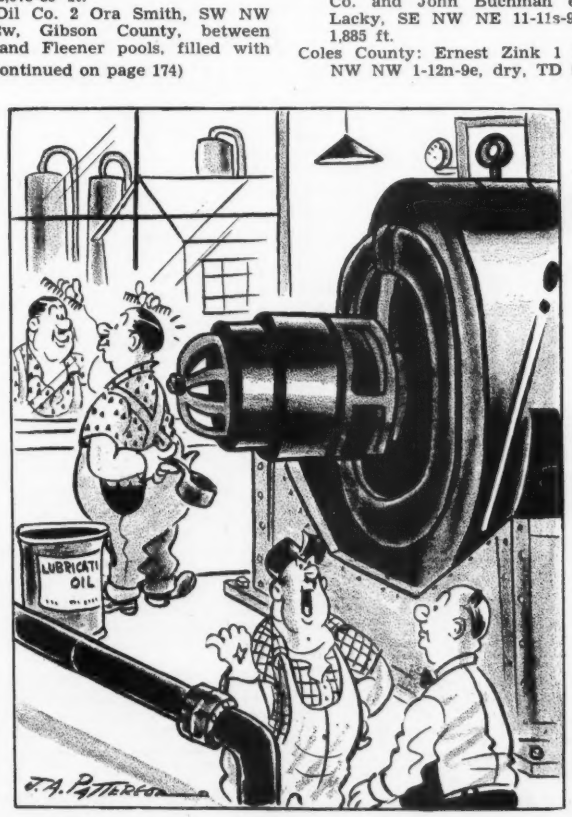
Ross Bartmess is cleaning out for a McClosky test at 1 Whipple, NW NW SW 23-3s-5e, Hamilton County. Casing was set at 3,285 ft. following recovery of 270 ft. of oil-cut mud on a drill-stem test at 3,282-3,382 ft.

In the Allendale area of Wabash County, Ashland Oil & Refining Co. and Hayes Drilling Co. have completed 2 J. L. Case, SW NE SW 30-1n-12w, with an initial production of 340 bbl. daily from the Biehl sand at 1,610-34 ft.

ILLINOIS WILDCAT FAILURES

Hardin County: Ashland Oil & Refining Co. and John Buchman et al 1 R. Lacky, SE NW NE 11-11s-9e, dry, TD 1,885 ft.

Coles County: Ernest Zink 1 Didley, NE NW NW 1-12n-9e, dry, TD 991 ft.



"No wonder his motors never get any oil—Romeo there, puts it all on his hair"

STATISTICS and T

WEEKLY WELL COMPLETIONS . . . WEEK ENDED NOVEMBER 20, 1948*

	Total of all wells					Cum.		Wildcat completions and discoveries										
													Cumulative total, 1948					
	Comp.	Oil	Gas	Dry	Footage	1948	1947	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	24	12	0	*12	23,857	1,340	1,539	0	0	0	0	0	0	0	0	0	0
Pennsylvania	41	20	1	†20	71,354	2,285	2,773	0	0	0	0	0	0	0	9	14	23
West Virginia	23	8	10	5	62,990	740	781	0	0	1	0	1	3	0	37	43	83
Ohio	31	10	8	13	69,819	1,243	1,213	0	0	0	1	1	2	0	10	34	46
Indiana	25	9	0	17	48,187	984	583	1	0	0	4	5	27	0	1	79	107
Kentucky	17	8	1	8	24,787	712	661	1	0	0	0	1	9	0	0	37	46
Illinois	33	16	0	17	89,715	2,210	1,868	0	0	0	2	2	46	0	1	338	385
Michigan	16	7	0	9	44,474	787	831	1	0	0	6	7	17	0	10	240	267
Kansas	62	26	2	‡34	204,707	2,802	2,423	3	0	0	18	21	56	0	7	398	461
Neb., Mo., Iowa	0	0	0	0	0	9	5	0	0	0	0	0	0	0	0	7	7
Oklahoma	64	40	2	22	234,514	3,741	3,623	3	1	0	7	11	117	8	27	570	722
Texas	279	180	14	85	1,211,895	10,703	8,260	6	3	1	48	58	303	31	90	1,840	2,264
North Central (Dist. 7-B & 9)	80	48	1	31	231,258	3,334	2,610	2	1	0	16	19	109	1	13	675	798
West (Dist. 7-C & 8)	64	54	0	10	271,925	2,873	2,014	1	0	0	6	7	62	1	5	206	274
Panhandle (Dist. 10)	22	16	5	1	69,093	587	422	0	0	0	0	0	1	0	3	11	15
Eastern (Dist. 5 & 6)	15	11	1	3	87,803	529	510	0	0	0	1	1	12	2	0	107	121
Gulf Coast (Dist. 2 & 3)	52	32	4	16	365,105	1,683	1,406	2	2	0	10	14	71	22	32	389	514
Southwest (Dist. 1 & 4)	46	19	3	24	186,711	1,697	1,298	1	0	1	15	17	48	5	37	452	542
Louisiana	38	25	0	13	220,118	2,083	1,427	1	0	0	5	6	43	25	8	194	270
Northern	20	12	0	8	61,308	1,403	845	0	0	0	4	4	4	4	2	98	108
Southern	18	13	0	5	158,810	680	582	1	0	0	1	2	39	21	6	96	162
Arkansas	5	3	0	2	23,802	274	295	1	0	0	1	2	6	0	0	82	88
Mississippi	8	7	0	1	51,990	370	438	0	0	0	1	1	4	1	3	86	94
Southeastern States	3	0	0	3	16,010	51	56	0	0	0	3	3	0	0	0	47	47
Montana	9	6	1	2	27,586	267	270	0	0	0	1	1	4	0	0	21	25
Wyoming	23	15	0	8	108,902	518	232	0	0	0	3	3	25	0	2	65	92
Colorado-Utah	4	3	0	1	16,504	208	184	1	0	0	1	2	3	0	5	45	53
New Mexico	11	7	3	1	52,519	536	476	0	0	0	1	1	4	1	3	51	59
California	57	44	0	13	231,166	2,555	1,798	4	0	0	10	14	112	1	5	307	425
Total United States	774	446	42	286	2,834,968	34,418	29,736	22	4	2	112	140	781	67	218	4,498	5,564
Total previous week	794	452	73	269	2,794,297	33,644	29,019	19	0	2	99	120	759	63	216	4,386	5,524
Total November 22, 1948	717	391	49	277	2,379,525			20	2	6	89	117	632	86	202	3,655	4,575

Service wells included: *12, †20, ‡1.

CRUDE PRICES AND REFINERY ACTIVITY

GRAVITY SCHEDULES

Gravity—	Signal Hill, Calif.	Okla-homa, Kansas	Gulf Coast Tex.*	West Tex.†
18-18.9	$2.17	....	....	....
19-19.9	2.19	....	....	....
20-20.9	2.21	$2.25	....	$2.12
21-21.9	2.23	2.27	....	2.14
22-22.9	2.27	2.29	....	2.16
23-23.9	2.30	2.31	....	2.18
24-24.9	2.34	2.33	$2.56	2.20
25-25.9	2.38	2.35	2.58	2.22
26-26.9	2.41	2.37	2.60	2.24
27-27.9	2.45	2.39	2.62	2.26
28-28.9	2.49	2.41	2.64	2.28
29-29.9	2.52	2.43	2.66	2.30
30-30.9	2.56	2.45	2.68	2.32
31-31.9	2.59	2.47	2.70	2.34
32-32.9	2.62	2.49	2.72	2.36
33-33.9	....	2.51	2.74	2.38
34-34.9	....	2.53	2.76	2.40
35-35.9	....	2.55	2.78	2.42
36-36.9	....	2.57	2.80	2.44
37-37.9	....	2.59	2.82	2.46
38-38.9	....	2.61	2.84	2.48
39-39.9	....	2.63	2.86	2.50
40 and above	....	2.65	2.88	2.52

*For crude from Daboval, El Campo, and Sand Point. †Includes Lea County, New Mexico. Last general price change represented a 50-cent increase becoming effective December 6, 1947. (For detailed price changes in all fields see The Oil and Gas Journal, January 1, 1948, page 107.) Effective September 28, 1948, Phillips Petroleum Co. advanced prices 35 cents per barrel over those shown in above table in fields of southwestern states where it buys. Advance has not been generally met by other buyers.

A.P.I. REFINERY REPORT, WEEK ENDED NOVEMBER 13

(Thousands of barrels)

District—	Crude runs, daily avg.	Production: Gasoline†	Production: Kerosine	Production: Gas & dist. oil	Production: Residual	Stocks at refineries, bulk terminals, in transit and in pipe lines: Gasoline*	Kerosine	Gas & dist. oil	Residual
East Coast	872	2,109	312	1,293	1,460	21,415	10,766	26,192	12,375
Appalachian:									
District 1	91	308	52	85	84	2,321	428	979	442
District 2	71	248	30	79	124	1,024	131	258	196
Ind., Ill., Ky.	955	3,382	437	954	996	18,843	4,829	12,622	6,300
Okla., Kans., Mo.	429	1,583	175	515	497	8,169	1,599	6,353	2,998
Inland Texas	244	1,057	110	195	422	3,284	802	1,220	1,256
Texas Gulf Coast	1,450	4,375	889	2,567	1,864	15,873	4,038	15,292	11,081
La. Gulf Coast	458	1,358	399	716	530	5,121	2,255	4,253	3,600
N. La. and Ark.	80	218	57	67	115	2,285	490	685	328
Rocky Mountain:									
New Mexico	14	50	7	12	27	78	25	53	29
Other Rocky Mtn.	147	449	36	177	274	1,821	291	1,626	1,042
California	901	2,674	161	1,009	2,571	11,561	874	14,446	44,012
November 13, 1948	5,712	17,811	2,665	7,669	8,964	91,795	26,528	83,979	83,659
November 6, 1948	5,600	17,213	2,387	7,549	8,902	91,377	26,740	83,150	81,947
November 15, 1947	5,229	16,086	2,107	6,159	8,556	83,041	21,473	63,283	57,827

*Finished and unfinished. †At refineries including natural blended.

Bureau of Mines crude-oil stocks 233,982,000 bbl. as of November 13 —up 733,000 bbl. One year ago 222,901,000 bbl.

FLAT CRUDE PRICES

Representative posted schedules per bbl.	
East Texas	$2.65
Kettleman Hills, California*	2.14
Beauregard Parish	2.60
Illinois Basin	2.77
Pecos County, Texas (Yates)	2.35
Bradford, Pennsylvania	5.00
Eastern Ill. and Western Ind.†	2.77
Tomball, Texas Gulf Coast	2.83

*37°-37.9°. †35° and above.

TRENDS

DAILY AVERAGE PRODUCTION FOR WEEK

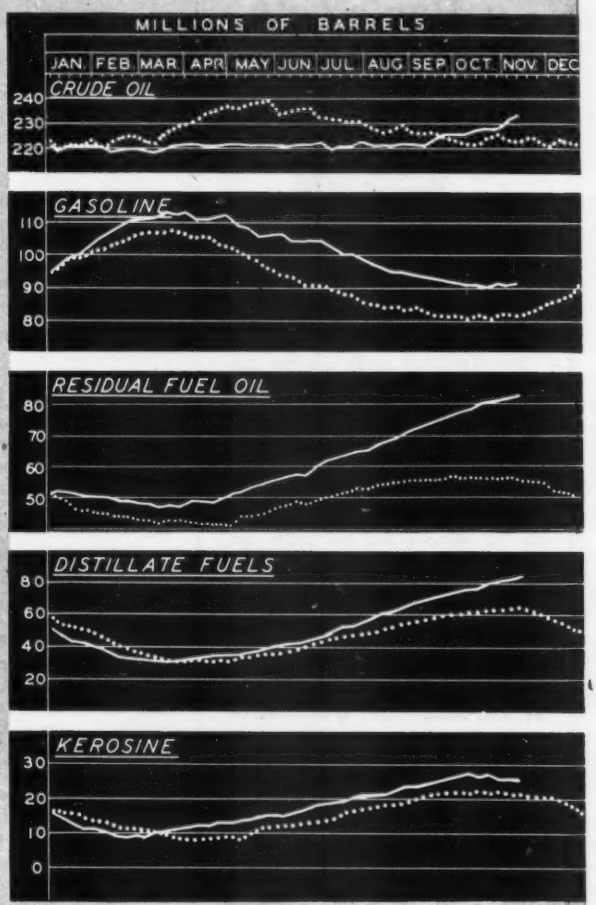
	Nov. 20 crude oil	B. of M. Nov. demand	Nov. 13 crude oil
Alabama	1,350	1,500	1,350
Arkansas	81,500	88,000	81,900
California	960,100	960,000	960,000
Colorado	48,970	48,000	47,220
Eastern	63,100	65,300	63,000
Florida	700	1,000	675
Illinois	179,500	167,000	178,600
Indiana	26,000	17,500	26,900
Kansas	307,600	306,000	279,450
Kentucky	24,100	23,000	24,500
Louisiana	493,250	500,000	493,700
North Louisiana	114,600	.....	115,050
South Louisiana	378,650	.....	378,650
Michigan	45,200	45,000	42,700
Mississippi	127,550	131,000	129,900
Montana	28,920	26,000	26,830
Nebraska	350	700	350
New Mexico	134,605	134,000	134,605
Oklahoma	440,900	436,000	439,500
Texas	2,523,850	2,460,000	2,523,850
Dist. 1 (Southwest)	27,640	.....	27,640
Dist. 2 (Southwest)	177,900	.....	177,900
Dist. 4 (Southwest)	255,050	.....	255,050
Dist. 3 (Gulf Coast)	504,310	.....	504,310
Dist. 5 (Eastern)	51,775	.....	51,775
Dist. 6 (Eastern)	124,875	.....	124,875
East Texas Field	297,500	.....	297,500
Dist. 7-C (West)	48,825	.....	48,825
Dist. 8 (West)	746,825	.....	746,825
Dist. 7-B (W. Central)	57,925	.....	57,925
Dist. 9 (N. Central)	142,525	.....	142,525
Dist. 10 (Panhandle)	88,700	.....	88,700
Wyoming	169,090	150,000	‡162,310
Total United States	*5,656,635	5,560,000	5,617,340
Change from prev. wk., up	39,295		

Total production January 1-November 20 †1,790,300,305 bbl.
Same period last year (crude plus cond.) 1,638,578,955 bbl.

*Not incl. 77,305 bbl. condensate. †Incl. 24,195,515 bbl. condensate. ‡Revised.

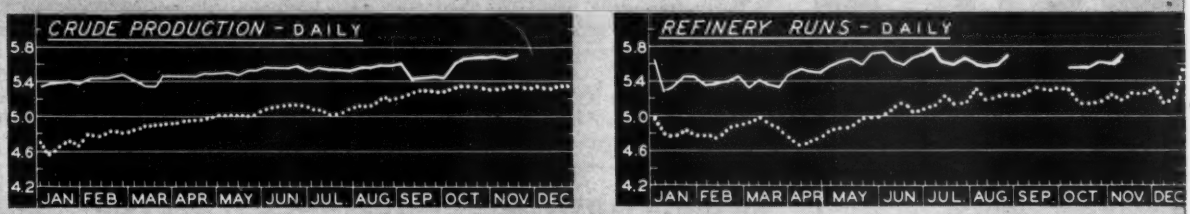
STOCKS IN UNITED STATES

---- 1947 ——— 1948



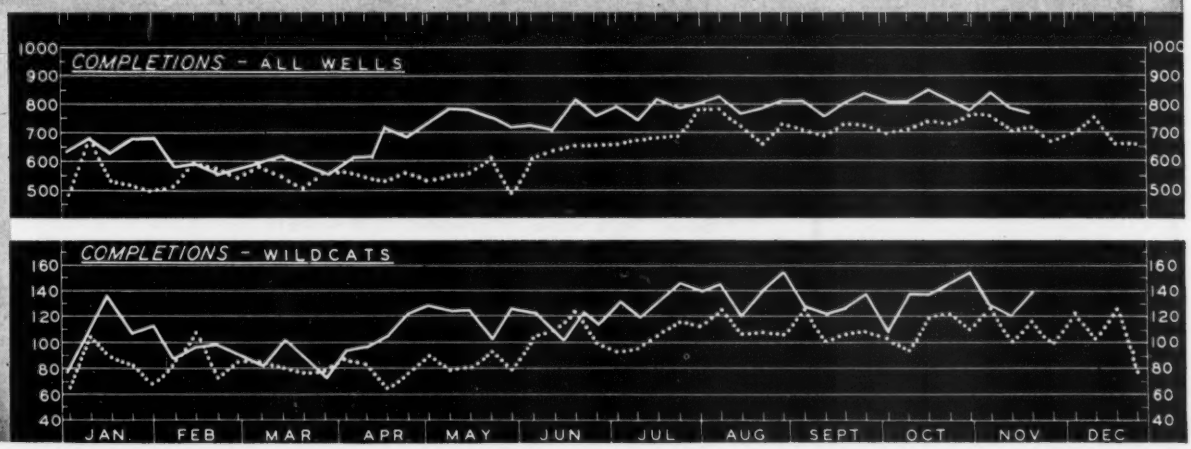
DAILY OPERATIONS

---- 1947 ——— 1948



WEEKLY COMPLETIONS

---- 1947 ——— 1948



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20" diam., 13" high, weight 90#.

$34.75, less 10% in quantities of four or more, delivered PREPAID parcel post in United States.

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MARKETS

AT the end of last week trading in the petroleum products spot market generally remained slow. Some changes in price levels of certain products in various areas were reported. With the first real taste of winter touching many areas in the United States last week marketers generally were looking for a strengthening in the tone of market trading from "kerosine on down."

Eastern Seaboard

Prices of heavy fuel oil came down sharply along the Eastern Seaboard last week as a result of continued weakness of this material. At week's end, Esso Standard Oil Co., the major supplier, announced a reduction in its price for heavy fuel oil of 21 cents at Gulf refineries and 20 cents at East Coast terminals.

At the same time, Esso Standard cut tank-car and barge prices of heating oil in amounts up to 0.3 cent per gallon and raised the tank-wagon price of motor gasoline by variable amounts up to 0.3 cent a gallon, both changes effective November 22.

The heavy fuel-oil reductions were effective November 19 and carried corresponding reductions for other residual types generally related in price. The company pointed out production and stocks of heavy fuel oil have increased materially in recent weeks. Despite the increased motor-gasoline price, all the adjustments represent a substantial reduction in total price received by the company for the affected products, according to the announcement.

Early this week Shell Oil Co., Inc., met all price adjustments of Esso in areas where it competes with Esso.

Reports in the New York area were that No. 6 was being offered on the Gulf Coast spot market at $2.20. Spot-market heavy fuel-oil prices in New York ranged from $2.70 to $2.80, but buying interest was still slack because of an anticipation of further weakening in this market.

Gulf Coast

A drop of 21 cents per barrel in the price level of Bunker C fuel on the Gulf Coast was noted last week. Despite the drop in price market sources reported that the fuel is not moving. The shipping strike on the East Coast was considered largely responsible. Under present conditions, one observer stated that a drop of 20 cents would probably be in line with the market. No. 6 spot material on the open market was reported available for prompt lifting at $2.20 and $2.21.

Mid-Continent

Buyer interest in the Mid-Continent area for all products from "kerosine on down" was expected to pick up soon, according to some sources. One observer pointed out that the colder weather would soon bring about the curtailment of considerable natural-gas deliveries to industrial consumers, consequently strengthening some of those materials which up to now have been "uncomfortably weak."

The heaviest movement of spot material in the Mid-Continent area continued to be that of kerosine, range oil, and No. 1 fuel oil. Gasoline, though not weak, showed no really firm demand and buyer interest was waning. One supplier said that he had considerable material (gasoline) that he would like to move.

One refiner reported that he had considerable No. 2 sold but that he was awaiting shipping orders. Of 150 contracts for the sale of material for November he had received only 10 shipping orders.

Representative Quotations

Representative spot-market quotations of leading suppliers as of November 22, 1948. **Figures are f.o.b. plant for tank-car shipment in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.**

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor	Texas Gulf Coast
Regular gasoline, 73-75 octane	10¼-10½	11.6-12* 10.5-11.9†	10¼-11½
Premium gasoline, 78-80 octane	11-11¼	10.6-13.4	11-12¼
42-44 w.w. kerosine	9½-9¾	10.3-11.7	9½-10¼
No. 2 straw fuel oil	9-9¼	9.4-10.1	9-9½
No. 6 residual	$1.70-2.00	$3.03-3.05	$2.20-2.52

*Branded (74-76 octane); †Unbranded (74-76 octane).

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	8½	8	8¼
Grade 18-55	10.2	9.6	9.9

LUBRICATING OILS

South Texas

200 vis., No. 2-3 neutral	12-13.5
750 vis., No. 3-4 neutral	15-16.5
2,000 No. 5-6 neutral	17-18.5

LUBRICATING OILS

Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	31-33
200 vis. No. 3 neutral, 0-10 pp.	19-20

Western Pennsylvania

144-155 vis. 10 p.t. bright stock	40.5
180 vis. p.t. neutral	38.5

CRUDE-SCALE WAX

Mid-Continent

132-134 A.M.P.	5½

JENSEN— Built to Solve Any Pumping Problem

Precision machined and shaved gears, roller bearings . . . adjustable stroke lengths, crank and beam weights . . . enable Jensen units to solve any pumping problem.

Because of simplicity of design, durability of construction, and the high quality of materials used, Jensen pumping units cost less to operate and maintain.

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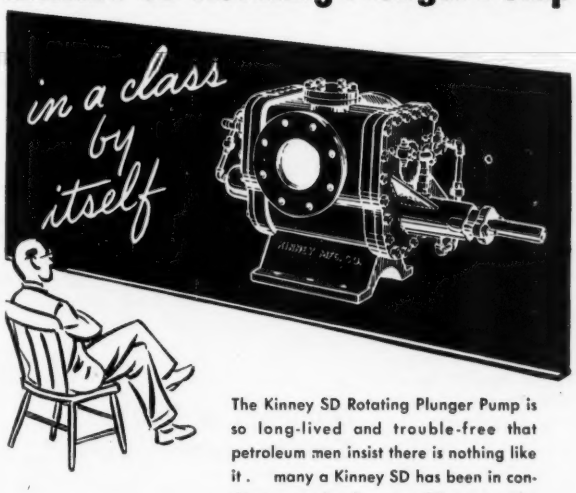
Export Office: 50 CHURCH STREET, NEW YORK CITY

KINNEY SD Rotating Plunger Pump



The Kinney SD Rotating Plunger Pump is so long-lived and trouble-free that petroleum men insist there is nothing like it . many a Kinney SD has been in continuous service for over 25 years. The rotating pump mechanism is unique in its simplicity — there are no valves, springs or gaskets and only one stuffing box. Displacement is positive and capacities range from a few gallons to over 3000 gallons per minute, handling all petroleum products from Diesel oil to heavy asphalt.

Write for Bulletin L48.

KINNEY MANUFACTURING CO.

3566 Washington St., Boston 30, Mass.

New York • Chicago • Philadelphia • Los Angeles • San Francisco

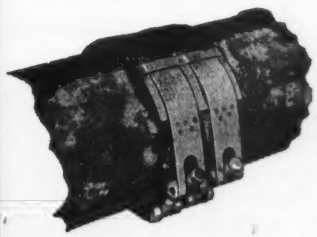
We also manufacture Vacuum Pumps, Clutches and Bituminous Distributors

HERE'S THE SOLUTION to PIPE LEAKS

New Marman Pipe Leak Clamps give you these features:

- √ Stainless steel for high strength, corrosion resistance, permanent repairs.
- √ Hycar pad resistant to deterioration by hot or cold water, gas, oil, etc.
- √ Can be used and re-used — outlast pipe.
- √ Easily and quickly installed by one person.
- √ Form naturally to pipe contour.
- √ Patch plate can be positioned for most advantageous installation.

HIGH PRESSURE TYPES

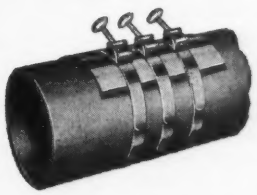


1100 P.S.I. Maximum

3 types for all pipe from 2 to 8 inches.

Largest size weighs only 6 pounds.

LOW PRESSURE TYPE



6 sizes fit all pipe from 1/2" to 12".

Adjustable to different pipe sizes.

Can be cut down to provide desired size or shape.

PATCHMASTER (all purpose)

800-1100 P.S.I. Maximum

4 sizes fit all pipe from 1/2" to 4".

Especially adaptable to pin-hole leaks.

1 Week Delivery — Write:

MARMAN PRODUCTS CO. INC.

940 W. REDONDO BOULEVARD
INGLEWOOD, CALIFORNIA

EQUIPMENT MEN ... in the News

Van Horn and Gearin Appointed by Fluor

Lee Van Horn has been appointed chief process engineer for Fluor Corp., Ltd., with headquarters in Los Angeles. He has been intimately connected with the development of refining processes for the past 20 years and will direct process research and engineering in connection with Fluor contracts in refining-plant construction.

LEE VAN HORN

HAROLD GEARIN

Harold Gearin has joined the sales staff of Fluor and is currently in the Los Angeles offices, studying details of company operations. He will shortly assume the responsibility of sales coordinator for district offices on refinery and other construction projects.

Smith Names Chanda To International Division

The International division of A. O. Smith Corp. has appointed Joseph W. Chanda to its sales staff as specialist on the sale of electric motors. Chanda has had wide experience in the export field, particularly in the small-tools and power tool industry. He has traveled extensively in Latin America and has had managerial experience. He has also been on the staff of the "American Exporter" as account executive and foreign-trade advisor.

Andrews Agency, Inc. Wins Seven Consecutive Awards

Andrews Agency, Inc., of which Arnold Andrews is president, has been awarded seven consecutive national advertising awards, "For Most Effective Use of Business-Paper Advertising," according to announcement. The latest recognition given the agency is the 1948 Putnam Award. The contest in which the award was earned was based on the best documentation of results. It provided $1,000 for both agency and advertising client.

Photogrammetric Engineers Opens New York Office

Jack Ammann Photogrammetric Engineers, of San Antonio, pioneering aerial-mapping firm, is expanding its facilities with the opening of a new eastern office at 34 Webster Avenue, Manhasset, N. Y.

William H. Meyer, Jr., who has been engaged in photogrammetric work since 1927, will be the manager of the new eastern office.

Graham Organizes Instruments, Inc.

O. W. Graham, who recently developed a gamma-ray level-control instrument known as the Gagetron, has completed the organization of Instruments, Inc., Tulsa, of which he is president. Instruments, Inc., is national distributor of the Gagetron and will also design and manufacture other kinds of electronic and mechanical instruments.

Graham began his career with the Western Electric Co. in 1937. After the outbreak of war, he joined Texas Development Co.'s research laboratory where he developed the Penetron besides assisting in the development of various other types of army equipment. After Texas Development Co. sold the manufacturing rights on the Penetron to Engineering Laboratories, Inc., of Tulsa, Graham worked with that company in the manufacture and further development of the Penetron.

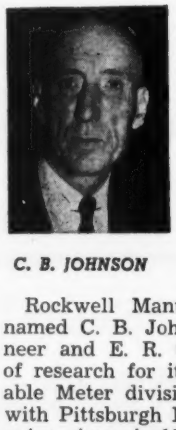
Fisher Governor Names Cleveland Representative

Fisher Governor Co., Marshalltown, Iowa, announces the appointment of A. E. Ehrke & Co. as the Fisher district sales representative in the Cleveland area. The Ehrke organization replaces Tomlinson Steam Specialty Co., former Fisher representative.

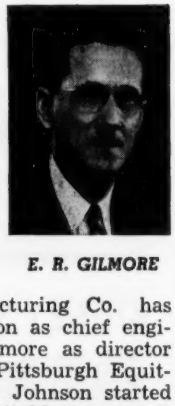
Bucyrus-Erie Appoints Spudder Distributor

Hauco Supply Co., Greensburg, Pa., was recently appointed distributor for its line of oil-well spudders by Bucyrus-Erie Co., South Milwaukee. The firm will handle Bucyrus-Erie spudders in a number of Pennsylvania counties.

Rockwell Appoints Johnson and Gilmore



C. B. JOHNSON



E. R. GILMORE

Rockwell Manufacturing Co. has named C. B. Johnson as chief engineer and E. R. Gilmore as director of research for its Pittsburgh Equitable Meter division. Johnson started with Pittsburgh Equitable as a product engineer in 1929 and in 1941 went to Pittsburgh-DuBois Co. as chief engineer. He later returned to Rockwell as chief engineer of Nordstrom Valve division.

E. R. Gilmore, who joined the company in 1936, was formerly chief engineer of the meter and regulator divisions. His new duties will involve research, new products, and giving closer engineering representation to the field.

Schlumpf of Hughes Tool Receives Award

Among the major awards made at the annual convention of the American Society for Metals was the honoring of Robert W. Schlumpf, chief metallurgist of Hughes Tool Co. with a distinguished service award. Presented to Schlumpf at the annual banquet of the convention in Philadelphia, the award read "for outstanding work in the utilization of alloy steels in oil-well-drilling equipment." Schlumpf is considered a leading authority in the metallurgical field pertaining to oil-well-drilling metal processing.

G. E. Mobile Exhibit Touring U. S. Cities

General Electric's rolling "Carnival of Measurements" exhibit has embarked on a year-long, 14,000-mile tour of 80 major United States industrial centers.

Featuring "Instruments in Industry," the collection of more than 150 electrical measuring devices manufactured by the G. E. Meter and Instrument divisions, West Lynn, Mass., will be displayed some 300 times in the next 9 months to selected groups concerned with the science of measurement.

Continental Supply Names Store Managers

W. M. Wright, former bookkeeper at Graham, Tex., for Continental Supply Co., has been appointed store manager, replacing C. A. Ross, who has been transferred to Wichita Falls as manager. He succeeds W. R. Everett, Jr., who has been moved to Pampa, Tex., in the same capacity. The former Pampa store manager, C. T. Wagner, has resigned.

Mestier Joins New York Office Allis-Chalmers

A. Joseph Mestier, Jr., has been assigned to Allis-Chalmers' New York district office as petroleum sales representative, according to an announcement by J. L. Singleton, vice president and director of sales of the company's general machinery division. A petroleum-geology graduate of Massachusetts Institute of Technology, Mestier joined Allis-Chalmers in 1946.

Billingsley Join Aeroquip

SAM BILLINGSLEY

L. A. Pyeatt, general sales manager of Aeroquip Sales & Engineering, Inc., Fort Worth, has announced the appointment of S. R. Billingsley as sales engineer. Billingsley comes to Aeroquip from Mid - Continent Supply Co., where he was the Fawick Clutch representative for the Mid-Continent area.

Wagner Wins Citation

Edmond M. Wagner, acting works manager, Waldrip Engineering Co., has been presented, on behalf of the President of the United States, a citation "for an outstanding contribution to the work of the Office of Scientific Research and Development during World War II." Wagner has been identified with the petroleum industry, in metallurgy and in the mechanical and petroleum-engineering fields, particularly with reference to hydraulic oil-well pumps and related surface and subsurface equipment.

Moule Appointed Sales Manager, Plomb Tool

THOMAS B. MOULE

Thomas B. Moule, formerly assistant director of sales, has been appointed sales manager of Plomb Tool Co., Los Angeles, according to M. B. Pendleton, president. Moule joined the company in 1944. For 3 years he was sales manager of the Republic and the Northern Aircraft products divisions of Aviation Corp.

Ideco Extends South American Services

George W. Walton, vice president in charge of machinery and export division of Ideco, announces the establishment of an office in Caracas, Venezuela, at which point Tom Alexander and Merwin Vollmer will be headquartered permanently. These men will accompany Mel Cooper, head technical representative, on various trips in Venezuela during his present sojourn in that country.

Vollmer, Cooper and Alexander to travel Venezuela

The addition of Alexander and Vollmer to the South American sales force will place Ideco representatives at all key Latin-American locations. Carey B. O'Connor represents the Ideco line in Brazil and Adrian D. Bolland in Argentina.

Prior to assignment to their South American post, Alexander and Vollmer spent many months at the various Ideco plants participating in the engineering, construction and field maintenance of Ideco equipment.

Athey Appoints Britton and Schlenk

G. O. BRITTON

E. B. SCHLENK

Appointments of G. O. Britton as domestic sales manager and E. B. Schlenk as district representative have been announced by B. F. Lease, president of Athey Products Corp.

Britton, formerly assistant domestic sales manager, was sales manager of Kaiser-Frazer Farm Implement division before joining Athey.

National Bearing Opens Foundry at Meadville

National Bearing division, American Brake Shoe Co., announces the opening of new nonferrous foundry, the newest of Brake Shoe's six postwar plants, at Meadville, Pa. Having closed four old plants in the National Bearing division, the company is concentrating production for the eastern area in the new Meadville foundry. The new plant has a total of 185,245 sq. ft. of floor space or the equivalent of nearly 4½ acres under one roof. All construction is of brick, concrete, and structural steel.

Reading-Pratt & Cady Appoints Charles Haslup

Charles L. Haslup has been appointed sales manager of field operations for Reading - Pratt & Cady division of American Chain & Cable Co., Inc., Reading, Pa. Haslup has had long experience in sales supervision in the valve industry.

Oklahoma Glass Fiber Producing Pipe Wrap

Oklahoma Glass Fiber Corp., Tulsa, has started production of a complete line of glass-fiber products, including glass paper for pipe wrap, glass filter, and insulation. H. T. "Bus" Holland, Jr., Tulsa, and P. Modigliani, of New York, are chief executives and joint owners of the corporation. The main plant of Oklahoma Glass Fiber Corp. is located at Newport, Ark.

Classified Advertising

The Market Place for the Oil Industry

UNDISPLAYED

All ads, 12 cents a word. Minimum charge, $3.00 per insertion.
Centered Line, any ad, $1.00.
Box Numbers count 9 words when replies are to be sent to our Tulsa Office. Replies forwarded without charge.

DISPLAYED, PER INCH

$12.00 per column inch per insertion. One-point border and 12-point capitals are allowed. Larger type sizes not accepted.

All classified advertising payable in advance.
10% Discount if 3 insertions are ordered at one time.
COPY DEADLINE, 9:00 a.m. Monday prior to each week's issue.

THE OIL AND GAS JOURNAL
P. O. Box 1260, TULSA, OKLAHOMA

EQUIPMENT FOR SALE

FRANKS double drum model 5000 spudder, excellent condition. Mast, lines, tools, dog house, light plant, butane tank. Complete and ready to go. Gleason Drilling Co., Russell, Kansas.

FOR SALE: Wilson well servicing unit, mounted on International truck, complete with line and tools, for depths to 4000'. Excellent condition. Box C-676, The Oil and Gas Journal, Tulsa, Oklahoma.

PARTS FOR ARMY TRUCKS

New and Used

Largest stock in America, 8x8, 6x4, 4x4 4x2. All items guaranteed. Largest auto wrecking house in the west with most complete stock of new and reconditioned parts for all cars and trucks. New jeep power units complete with radiators and stub shafts. Fast service.

PIONEER AUTO WRECKING CO.
732 W. 13th Ave. Denver 17, Colo.

EQUIPMENT FOR SALE

FOR CABLE TOOLS
DEGEN PIPE AND SUPPLY CO.
Box 107, Red Fork Station, Tulsa, Oklahoma

FOR SALE: Wilson Super Model Winch powered by 6 MZR Waukesha engine. Terms. Melton Supply Company, Seminole, Oklahoma.

FOR SALE: Wilson Master Model Winch powered by 6 MZR Waukesha engine. Unit mounted on one and one-half ton Chevrolet truck equipped with fifty foot single pole telescoping mast. Terms. Melton Supply Company, Seminole, Oklahoma.

FOR SALE: One 36-L Bucyrus-Erie Spudder, trailer mounted. Casing tackle equipment. Waukesha motor. Brand new. Latest model. Has never been used. Asking delivery price, no bonus. Telephone 166-J, Mt. Carmel, Illinois.

YALE AND TOWNE

2" 80 GPM bronze fitted pumps with 3 hp. 3 ph. gearhead, explosion proof motors. New: $300 each, F.O.B. Tulsa.

TULSA PUMP COMPANY
216 East Archer Tulsa, Oklahoma

MANUFACTURERS LATEST DESIGN

Hydraulic Casing Pulling Units. Complete line of equipment. Units made to your specifications. Truck Mountings or Skid Units. Repair Service and Parts

OKLAHOMA MACHINE & SUPPLY CO.
Ada, Oklahoma

FOR SALE
USED COMPRESSORS

20—Ingersoll-Rand Belt Driven, Type 10 Compressor Units:
Two stage 5½ x 10½—12" stroke
Two stage 10 x 18—12" stroke
Single stage size range from 6 x 8 to 17 x 12

For inspection, correspond with or call:

SOUTH PENN NATURAL GAS COMPANY
Parkersburg, West Virginia

EQUIPMENT FOR SALE

FOR SALE: Two used WAK Waukesha Engines completely overhauled; one NK Waukesha Engine complete with clutch. Priced to sell. Lesh Drilling Company, Box 305, St. Elmo, Illinois, telephone 261.

FAILING MODEL 314-C truck-mounted rig, water truck, Wheatley 6x6 pump, tool trailer, light plant, and complete tools. Most complete rig and low price warrant attention. W. D. Glenn, Box 428, Aurora, Colorado.

FOR SALE: Fort Worth Super-N ($3225.00) and Fort Worth Model-N ($2225.00) with all tools. Very good condition. Trucks and trailers additional, low priced. C. S. Turet, Great Bend, Kansas. Phone 5082.

PIPELINE Construction Equipment for Sale: Pipe cleaning machine with priming head, traveling or stationary, 6" to 12", excellent condition, $1,350. Two T40 International tractors with pipelayer attachments, good condition, very cheap. Contact C. W. Sternberg, 8250 Wier Drive, Houston, Texas. Phone Preston 7043.

FOR SALE: Used Equipment in good condition: 2—6 cylinder Winton gasoline engines—7¼" bore, 8" stroke, 220 H.P. at 1050 RPM, direct connected, General Electric generator, 110 KW, 700 volts, Exciter generator 1½ KW, 64 volts, electric and air starter. 2—Traction motors on 653, G.E. type 240-E, 600 volt, 110 H.P. If interested make offer to J. H. Lauderdale, Missouri Pacific Lines, 1001 Missouri Pacific Bldg., St. Louis, Missouri.

FOR SALE: 300 KW, 375 KVA, natural gas generating unit. Powered by Hope 450 H.P., 5 cylinder engine. Equipment includes engine, generator, exciter, control panels, gas pressure tanks, cooling system. Contact United States Gypsum Co., 300 West Adams Street, Chicago 6, Illinois. Attention R. C. Gimlin.

38 D.S. INTERNATIONAL equipped with 29 barrel tank. McDonald pump and other tank cleaning equipment. Box C-666, The Oil & Gas Journal, Tulsa, Oklahoma.

7" N-80 Grade—8 Round Thread—
Long Type—New

CASING COUPLINGS

F.A.S. New York ..... $14.80 ea.

F.A.S. Houston ..... $14.30 ea.

Ready for Inspection

AMCOT EXPORT CO.
475 Fifth Ave., N. Y. MU 9-4544

"BIG INCH" Line Pipe

Delivery From Stock

24" O.D. x ⅜" Wall Electric Weld—
Made to A.P.I. Specifications 5L-X.

Also Prompt Delivery on Other Specifications of 24" O.D., As Well As 26" O.D. and 30" O.D.

LUCEY PRODUCTS CORPORATION
OIL WELL SUPPLIES
TULSA, OKLAHOMA

USED STEEL PIPE

30" O.D.—¼" wall
20 ft. to 30 ft. lengths
Ideal for Culverts

Write—Wire—Phone

SONKEN-GALAMBA CORPORATION
2nd and Riverview (X-389)
Kansas City 18, Kansas
THatcher 9243

EQUIPMENT FOR SALE

FOR SALE: Two type J 120 Reda Pumps complete with 6500′ of cable each. Two extra type V-25 pumps and one extra motor. Three 125 horsepower 300 w.p. straight leg steam boiler with burners and fittings. Excellent condition. Box 4725, Phone 62-6143, Oklahoma City, Okla., Mach-Bridges.

FOR SALE: ELI Model M6W Rig. Suitable for core drilling and shot hole drilling to 1000′. Mounted on 1946 Ford, 6x6 Wheatley pump, 1000′ 2⅞ drill pipe, water truck, trailers, complete auxiliary equipment, everything practically new. Must sell immediately. E. A. Carter, 416 Wilson Bldg., Dallas, Texas.

BIDS will be received by the City of Muskogee, Oklahoma, for Apx. 15800 L.F. of 4″ Steel Pipe to be salvaged by buyer, average depth 2½ to 3 feet, Dresser Sleeve connected. Bids close December 15, 1948. Address: J. R. Keeth, City Engineer, Muskogee, Oklahoma.

I HAVE 2,250 feet 20± 7″ lapweld casing at $2.35 a foot, F.O.B. Ora Oil Field, Union Parish, Louisiana. If interested, contact R. T. Sellars, Telephone No. 3170, Monroe, Louisiana.

FOR SALE: Cardwell self-propelled drilling and well servicing unit, complete with lines and tools for depths to 4000′. Excellent condition. Box C-675, The Oil and Gas Journal, Tulsa, Oklahoma.

2 GASO Fig. 1743 5½″ x 10″ horizontal duplex, enclosed type, all Timken bearing piston power pumps, Factory rating 213 gpm @ 500 lb. @ 54 rpm, together with two drives including 75 hp., 2300 volt motors.

POTASH COMPANY OF AMERICA
P.O. Box 31, Carlsbad, New Mex.

FOR SALE—USED GAS ENGINES

37—Stationary Gas Engines—2 cycle, with Belt Wheels. Make—Bessemer, Foose. Sizes range from 22 H.P. to 80 H.P. For inspection, correspond with or call:

SOUTH PENN NATURAL GAS COMPANY
Parkersburg, West Virginia

SHOT HOLE DRILLS
LARGE AND SMALL

All are truck mounted, rotary chain pull down, smallest pump size 3½ x 5. Some are in excellent condition, others need repairs. Price FOB Dallas from $3,000.00 to $8,000.00 including truck. For details write 8000 Lemmon Ave., Dallas 9, Texas.

FOR SALE

Used Oil Well Casing and Tubing

Now have in stock: 5½ in. casing, 14, 15½, and 17 lb. seamless or lapweld 7 in. O.D. casing, 17, 20, 23, 24, & 26 lb. seamless or lapweld 2 in. tubing upset.

Regular or lapweld 2½ in. tubing upset or regular seamless 10-in. drive pipe or casing.

ALL SUBJECT TO PRIOR SALE

OIL PRODUCERS INC.
314 Murray Bldg.
Grand Rapids, Michigan
Phone: Glendale 49201

EQUIPMENT FOR SALE

FOR SALE: Model 76 Star Drilling Rig complete w/ 5″ & 7″ tools. Dietz Drilling Co., 438 N. Elm St., Henderson, Ky.

10 H.P. BETTIS steamer, mounted on two wheel trailer. Less than 100 hours service. Cheap. Box C-667, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: We have abandoned several gasoline plants in Oklahoma and have available, cheap, quantity such items as absorbers, centrifugal and steam pumps, gas and steam turbines, steam engines, closed type heater and cooling sections, cooling towers, horiz. engine compressor units. Catalog with prices listing such material available upon request. Cities Service Oil Company, Patridge, Bartlesville, Okla.

FOR SALE OR TRADE

10,000′ 5½″ 14# Seamless Casing located Oklahoma City. Prefer to participate in oil deal. Write details. Box 995, Dallas, Texas.

FOR SALE

One Wilson Titan Rig, Complete.

Box C-686, The Oil and Gas Journal

Tulsa, Oklahoma

No. 1 Used

LINE - CASING - TUBING

Range 1 Lapweld

Heavy weight, excellent condition. Available for inspection. Inquiries invited from rated quantity buyers.

W. J. BAINBRIDGE

890 Ernst Place **Meadville, Pa.**

EQUIPMENT FOR SALE

FOR SALE: 3600 feet of 7 inch O.D. 17 lb. oil well casing; 3250 feet of 7 inch O.D. 24 lb. oil well casing. Price Oil Company, 630 E. Town Street, Columbus 15, Ohio. Phone Adams 1489.

WELL drilling spudders, beams, light rotaries, core drills, tools, casing. Used equipment at money saving prices. Spang and Mills new tools. Leschen lines. Everything for well drilling. Pressey & Son, Pueblo, Colo.

FOR SALE

One Cardwell Drilling Rig Complete. Capable of drilling to 4,000 feet.

ACME DRILLING & SERVICING CO.
515 Hales Building, Oklahoma City, Okla.

WE SOLICIT INQUIRIES

FOR MINIMUM CARLOAD QUANTITIES

NEW PLAIN HOT ROLLED MILD STEEL PLATES—min. 3/16″ to 1″ inclusive.
NEW PLAIN HOT ROLLED AND ANNEALED MILD STEEL SHEETS—8 gauge to 28 gauge inclusive.
NEW HOT ROLLED MILD STEEL ANGLES—1″ x 1″ x ⅛″ to 6″ x 6″ x ½″ inclusive.
NEW MILD STEEL PLAIN AND DEFORMED ROUND REINFORCING BARS—⅜″ to 1¼″ inclusive.

All specifications within the range of sizes listed are available. Check with us for early delivery dates.

FABRIKANT
STEEL PRODUCTS, Inc.
10th Floor—Woolworth Bldg., New York 7, N. Y.
BEekman 3-3041
CABLE ADDRESS: FABKANT, NEW YORK
Member: Association of Steel Distributors

FOR SALE—TWO STEEL PIPE MILLS

1—Manufacturers Seamless tubing from billets capacity to 6⅝″ O.D.

1—Resistance Weld Mill capacity to 6⅝″ O.D.
Suitable for manufacturing oil well casing.

Also—six 100 KW Diesel Generator Units

Priced to Sell

ARKO PRODUCTS CO.

546 Second Av., Detroit **WOodward 1-1894**

USED STEEL TUBING

95,000 ft.	1½″ O.D.	Approx. 9 gauge wall
120,000 ft.	2″ O.D.	Approx. 11 gauge wall
55,000 ft.	2¼″ O.D.	Approx. 11 gauge wall
75,000 ft.	3¼″ O.D.	Approx. 10 gauge wall
80,000 ft.	4″ O.D.	Approx. 10 gauge wall
21,000 ft.	5½″ O.D.	Approx. ¼″ wall

Single or Double Random Lengths—Plain Ends
Beveled for Welding

Write—Wire—Phone

SONKEN-GALAMBA CORPORATION
2nd and Riverview (X-338) Kansas City 18, Kansas
THatcher 9243

EQUIPMENT FOR SALE

FOR SALE: In Kansas, several 94′ and 122′ Angle Iron Drilling Derricks. Inventory and prices upon request. Cities Service Oil Co., Patridge, Bartlesville, Okla.

FOR SALE: One Chicago Pneumatic gas compressor. Size 10 X 10. Type N.S.B. Machine as good as new. Laughner Oil & Gas Co., Box 539, Ambridge, Penna.

1—4,000′ POWER Rotary Drilling Rig complete with 87′ Moore Mast and Subbase. 2 EK Waukesha Motors with extension shafts (V-Belt), excellent condition. 6 x 16 Wilson Snyder Power Pump. 5 Drill Collars, Kelly, Etc. Will sell as one unit or separately. Phone 41213, Wichita, Kansas.

FOR SALE: At Ponca City Refinery, approx. 4,000 1 gallon lithographed new insecticide cans. 10c each take entire lot. Cities Service Oil Co., Patridge, Bartlesville, Okla.

FOR SALE subject to prior sale: nine 30″ by 16′ Type T Heat Exchangers with 6″ by 300# inlets and outlets built by Struthers-Wells 1943 also two 8′ by 12′ Oliver Continuous Filters complete. Used. Location South Carolina. Box C-690, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: New Steel Pipe—4″ to 14″. E. A. Tompkins Co., 2203 E. 28th St., Long Beach 6, Calif. Teleph. 4-5569.

STEEL TANKS IN STOCK

1—74,000 BBL. LIKE NEW 114′ X 40′ TANKS ARE CLEAN — AT MORGANTOWN, W. VA.

1—8000 BBL. BOLTED AT NEW YORK

1—1000 BBL. BOLTED AT NEW ORLEANS

DARIEN CORP., 60 E. 42ND. ST., NEW YORK 17, N. Y.

MURPHY DIESEL, ME-66

Brand New—Sacrifice—At OEM's Cost 1103 cu. in., 6-cylinder, 180 HP, @1200 RPM. Never been used. 20% off list Contact: Box C-613, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE

Two Diesel Generator Rotary Drilling Rigs, one Waukesha Powered Rig. Complete inventory and prices on request.

CITIES SERVICE OIL COMPANY
Mr. Patridge, Bartlesville, Oklahoma

FOR SALE: USED PUMPS

19—Geared, Triplex, Outside Packed, Plunger Pumps. Make — National Transit — Denning — Gould; Sizes— 6 x 8, 5½ x 8, 5 x 6, 7 x 10. For inspection, correspond with or call:

SOUTH PENN NATURAL GAS COMPANY
Parkersburg, West Virginia

FOR SALE

13—330 H.P. Type 10 Bessemer New 17″ Power Cylinders complete ready to run with 16″ to 18″ Compressors. 1—330 H.P Clark Horizontal with Compressors. Located Salem, Illinois.

ENGLE PETROLEUM, Incorporated
Box 655, Evansville, Indiana

PORTABLE ELECTRIC GENERATING PLANTS

$295.00 Each. 3 KVA Single or 3 Phase. Delivers 3,000 watts at 125 volts 3 phase or three 1,000 watts, single phase. 4-cylinder gas engine. 9.5 H.P. at generator speed. Made by Hobart Brothers Co. Used but in good condition.

ROSE BROTHERS COMPANY
1400 Harrison Ave., Cincinnati 14, Ohio

EQUIPMENT FOR SALE

3000 ft. NEW 8⅝″ OD, Naylor Spiral Weld Pipe 40′ lengths, with Victrolic Couplings. A. A. Gilbert Pipe & Supply Co., Post Office Box 986, Shreveport, Louisiana.

FOR SALE: Near Lyons, Kansas, string 4½″ drill pipe with tool joints, about 3,000′. Now a part of drilling rig. $2.00 per ft. Cities Service Oil Company, Mr. Patridge, Bartlesville, Oklahoma.

FOR SALE: 3000′ 6⅝″ o.d. 20# lapweld casing, extra long couplings. 3″ No. 10 taper thread. This is No. 1 casing, price $1.75. M. J. Regan, Coffeyville, Kans.

FOR SALE: Wilson Mogul draw works powered by G.A.K. Waukesha engine. Good condition, priced for quick sale. Terms. Melton Supply Company, Seminole, Oklahoma.

FOR SALE: 7 Twin and 5 Single Clark Horiz. Engine Compressor Units in Oklahoma. Cities Service Oil Co., Patridge, Bartlesville, Oklahoma.

EQUIPMENT WANTED

WANTED TO BUY: One 8″ Standard Landis Pipe-threading Machine. Oilfield Salvage Company, Box 1362, Odessa, Texas.

HELP WANTED

OIL FIELD production engineer with capabilities of general superintendent to direct the completion of deep rotary drilled wells. Give record of experience. Initial salary $850.00 per month. Answers held confidential. Box C-679, The Oil and Gas Journal, Tulsa, Oklahoma.

OIL Industry Employment Service, 319 Castle Bldg., Tulsa, Okla. Tom Robinson, Mgr. Phone 4-5974. No fees to pay. Our best client needs six mechanical and civil engineers with one to ten years experience in Gulf Coast area. Good salaries. Needed in Persian Gulf area, Middle East. Division pipeline Superintendent, salary open. Rotary drillers $565. Rotary derrickmen $495. Oilfield welders $420. Write for details.

MANUFACTURERS AGENTS WANTED

to sell line of drill collar and tool joint thread compounds. Mid-Continent and Rocky Mountain areas. Write for details to:

THREAD COMPOUNDS MFG. CO.
P. O. Box 189 Gardena, California

HELP WANTED
PROCESS ENGINEER

Technical training and experience to handle problems on Natural Gasoline plant design. Furnish complete data and salary requirement.

Personnel Department,

CITIES SERVICE OIL COMPANY
Bartlesville, Oklahoma

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During the next several months we will increase our Engineering Organization engaged in the design of Oil Refinery Plants and Power Plants. Location Cleveland, Ohio. The men we need should be qualified as draftsmen, designers, checkers or in higher engineering skills on design of piping, instrumentation, pressure vessels, structural steel, concrete, mechanical or electrical For presenting your qualifications and prompt consideration, write to us for application form.

ARTHUR G. McKEE & CO.
2300 Chester Ave., Cleveland 1, Ohio

HELP WANTED

SUPERINTENDENT needed for new natural gasoline plant in northwestern New Mexico. Must be capable of inspecting construction work now in progress and training personnel. At least two years college training and prior supervisory experience necessary. Send details of experience and education to Southern Union Gas Company, 1104 Burt Building, Dallas 1, Texas.

SALES Representative for oil well spudders. Man with oil field background required. This is an unusual opportunity for a man who looks for future security by making a connection with an old, established manufacturer. Only men who have good record behind them need apply. In answering give age, education, experience, and salary requirements. Box C-659, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: **Seismologist** — For work in Venezuela on a career basis. Must have degree in science or engineering and 3 to 5 years' experience in interpretation of seismograph records. Good salary, living allowance, bonus. Apply by letter or in person, stating age, education, qualifications, etc. Replies will be held strictly confidential. Richmond Exploration Company, 515 International Trade Mart, New Orleans, Louisiana.

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HELP WANTED

LEADING manufacturer of oil field equipment is looking for a first-class Mechanical Engineer, if possible with a broad knowledge of field usage of drilling and servicing equipment. Primarily, want man with ability and knowledge to direct and manage engineering program. Applicants should furnish educational background, engineering experience and reference. Address Box C-635, The Oil and Gas Journal, Tulsa, Oklahoma.

PURCHASING

Outstanding opportunity for a man to advance in Purchasing Department of a large independent oil company. Character, intelligence, and initiative more important than experience, although engineering training and knowledge of materials will be helpful.

Give full details in reply to Box C-685

THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

WANTED

Kansas independent refiner has opening for young, aggressive salesman refined products. Tank car and tank truck delivery to mid-western markets.

Must be familiar with refining operations and equipment using products, especially diesel engines and home burners.

Give age, experience, and references.

Box C-660

THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

SITUATIONS WANTED

PRODUCTION SUPERINTENDENT. Graduate Petroleum Engineer. Age 35. Experienced Mid-Continent and Rocky Mountain production, drilling, and completion. Previous experience as sales engineer and manager major service company. Now employed in responsible position but desire change due to curtailment of employer's operations. Record and references on request. Box C-671, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOPHYSICIST: Graduate Engineer with ten years seismograph experience as Party Chief and Supervisor over twelve state area desires position in seismic review or interpretation at permanent location. Presently employed as Supervisor of several seismograph crews. If interested, please give general information as to salary and position available. Box C-677, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM ENGINEER with graduate work, experienced in drilling, completions, workovers, recompletions, geological and reservoir studies, desires position with independent producing company in Permian Basin area. Young, married, settled, unafraid of work. Box C-688, The Oil and Gas Journal, Tulsa, Oklahoma.

PIPE LINE Superintendent: Now employed. Experience in personnel, purchasing, construction and maintenance. Also experienced in all phases of electricity. Desires position with future. U. S. or foreign. Age 36, married, three children. Box C-683, The Oil and Gas Journal, Tulsa, Oklahoma.

OILFIELD SPECIALTY MANUFACTURERS
Manufacturers' agent for production and drilling accounts in the Gulf Coast of Texas and Louisiana, Arkansas and Mississippi, has opening for additional account. Can give complete coverage in this area. Can also furnish warehouse facilities in Houston. Box C-684, The Oil and Gas Journal, Tulsa, Oklahoma.

SITUATIONS WANTED

GRADUATE Petroleum Engineer, experienced in drilling, production, and sales service work desires position as field or sales-service engineer. Available now. Box C-678, The Oil and Gas Journal, Tulsa, Oklahoma.

REPRESENTATIVE, available Oklahoma territory, sales experience—drilling, producing, refining, and pipeline equipment and supplies. Box C-689, The Oil and Gas Journal, Tulsa, Oklahoma.

PRODUCTION Superintendent 15 years field experience in development and production. Age 37. College graduate. Qualified for field and office supervision of drilling, producing and engineering. Available after January 1st. Box C-670, The Oil and Gas Journal, Tulsa, Oklahoma.

LEASE AND DRILLING BLOCKS

BLACK Mesa Basin (N.E. Ariz.) acreage four structures fairly well blocked. Protective acreage other structures. Geology by C. C. Smith. Fred Blair Townsend, Luhrs Tower, Phoenix, Arizona.

300 ACRES, 125 wells, 25 foot Bartlesville sand 400 deep, 35 gravity, 70 bbl. daily production. Waterflood. Quick delivery. Box C-687, The Oil and Gas Journal, Tulsa, Oklahoma.

630-ACRE block, Osage County, Oklahoma. Near production with four sands 1600 to 2050'. Will farm out block to responsible operator who is financially able to drill several wells and develop block. Box C-652, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: Oil and Gas Leases in shallow territory and on structure. Will make flat price on one or more leases, drilling and casing one or more wells. W. P. Harley, Bowling Green, Ky.

TO LEASE for oil 640 acres Reagan County Texas 5 miles S. W. Styles 3 miles north University lands Quarter mile south Centerela on Middle Concher River at Big Rock. L. B. Dougal, 2001 Concourse, Bronx, New York.

WILL sacrifice 40 acre lease Lincoln County, Miss., 1/32 royalty interest in spread 4700 acres Ocala uplift Florida. 2½ acres mineral deed Grapeland field, Texas. Luella Schultz, 607 7th St. North St. Petersburg, Fla.

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Inquiries Invited
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60 Broadview Drive, Clayton (5), St. Louis, Missouri

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ROYALTIES

DEEDED ROYALTIES
San Juan Basin & Permian Basin. Write Harry S. Wright, Wright Bldg., Farmington, New Mexico.

ROYALTIES IN HOT AREAS!
Recent strikes have focused attention on Montana's deeper oil zones and major companies are moving fast, drilling and leasing. We buy direct in the field, sell direct to our customers. Write LANDOWNERS ROYALTIES COMPANY, Box 1225, Great Falls, Montana.

WANTED: ROYALTIES AND PRODUCTION. We are buyers. Send full particulars. Immediate action. Gerber & Company, 120 Wall Street, New York.

FOR SALE: Producing Gulf Coast Royalty. Payout basis ranging from 4 to 5 years. Full particulars available. C. Tyrrell Garth, Jr., Box 2586, Beaumont, Texas.

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California Fields

(Continued from page 162)

Santa Barbara County, Olivera Canyon Area: Union Oil Co. 5 McCroskey, 20-9n-32w, completed on pump, no estimate, elev. 743 ft., TD 5,250 ft.

Zaca Area: Tide Water Associated Oil Co. 31 Davis, 33-8n-31w, pumped 130 bbl. in 13 hr., water cut 32 per cent, elev. 1,102 ft., TD 5,018 ft.

Tide Water Associated Oil Co. 25 Davis, 33-8n-31w, pumped 347 bbl. daily gross, elev. 1,080 ft., TD 5,292 ft.

CALIFORNIA WILDCAT FAILURES

Fresno County, Panoche Creek Area: Jergins Oil Co. 48 Escarpedo, 28-14s-12e, dry, elev. 621 ft., TD 4,300 ft.

Kern County, Williams Area: F. L. Williams 1 Antelope Hills, 1-28s-19e, dry, elev. 887 ft., TD 3,865 ft.

Monterey County, Salinas Valley Area: The Texas Co. 1 Beedy NCT-1, 33-19s-7e, dry, elev. 1,191 ft., TD 5,147 ft.

San Ardo Area: Independent Exploration Co. and Oceanic Oil Co. 1 Cooper, 13-21s-8e, dry in basement Gneiss, elev. 489 ft., TD 1,502 ft.

Independent Exploration Co. and Oceanic Oil Co. 1 Thurman, 3-22s-9e, dry, elev. 624 ft., Conglomerate 1,305 ft., basement complex 1,685 ft., TD 1,785 ft.

Orange County, Placentia Area: Seaboard Oil Co. and Universal Cons. Oil Co. 1 Christianson, 5-4s-9w, dry, elev. 235 ft., TD 5,110 ft.

San Luis Obispo County, Cuyama Valley Area: Coast Exploration Co. 1 Coast et al, 33-11n-27w, dry, elev. 2,000 ft., brown shale 3,540 ft., TD 6,003 ft.

Richfield Oil Corp. 1 Margaret Travers, 23-11n-28w, dry, elev. 2,229 ft., TD 3,888 ft.

Solano County, Denverton Area: Honolulu Oil Corp. 2 McCormack Estate, 36-5n-1w, dry, elev. 32 ft., base Capay 713 ft., TD 2,496 ft.

Yolo County, Saxon Area: Shell Oil Co., Inc., 1 Saxon Unit, 7-7n-3e, dry, elev. 32 ft., TD 6,000 ft.

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CALENDAR OF EVENTS

November

American Society of Mechanical Engineers, annual meeting, Hotels Pennsylvania and New Yorker, New York, November 28-December 3.

December

New Mexico Oil and Gas Association, annual meeting, La Miradora Hotel, Hobbs, N. M., December 1.

Asphalt Institute, annual meeting, Engineers' Club, New York, December 1.

American Association of Petroleum Geologists, regional meeting, Rice Hotel, Houston, Tex., December 2-3.

Petroleum Electric Power Association twentieth annual meeting, Biltmore Hotel Oklahoma City, December 2-3.

National Gasoline Association of America regional meeting, Amarillo, Tex., December 10.

Interstate Oil Compact Commission, quarterly meeting, Allis Hotel, Wichita, Kans., December 9-11.

1949

January

Society of Automotive Engineers, annual meeting, Book-Cadillac Hotel, Detroit, Mich. January 10-14.

February

American Society for Testing Materials spring meeting and A.S.T.M. committee week, Hotel Edgewater Beach, Chicago, Ill., February 28-March 4.

March

National Association of Corrosion Engineers, annual convention, Cincinnati, Ohio, March 7-10.

American Petroleum Institute, Southwestern district, Galvez Hotel, Galveston, Tex., March 9-11.

American Petroleum Institute, division of production, Mid-Continent district meeting, Mayo Hotel, Tulsa, March 23-25.

New England Gas Association, Hotel Statler, Boston, March 24-25.

Western Petroleum Refiners Association, thirty-seventh annual meeting, Plaza Hotel, San Antonio, Tex., March 28-30.

American Chemical Society, division of petroleum chemistry, spring meeting San Francisco, March 27-April 1.

April

American Petroleum Institute, Division of Refining, mid-year meeting, Shamrock Hotel, Houston, April 4-7.

American Society of Lubrication Engineers, annual meeting, Pennsylvania Hotel, New York, April 11-13.

National Association of Corrosion Engineers, Netherlands-Plaza Hotel, Cincinnati, Ohio, April 11-13.

Southwestern Gas Measurement Short Course, University of Oklahoma, College of Engineering, Norman, Okla., April 12-14.

National Petroleum Association, Hotel Cleveland, Cleveland, Ohio, April 13-15.

Natural Gasoline Association of America, annual meeting, Texas Hotel, Fort Worth, April 20-22.

Southern Gas Association, annual convention, Buena Vista Hotel, Biloxi, Miss., April 20-22.

NOMADS

Houston Nomads, second Monday of each month, The Houston Club, Houston.

Los Angeles Nomads, second Wednesday each month, Jonathan Club.

Indiana Fields

(Continued from page 163)

salt water after a 20-qt. shot in the Waltersburg at 1,806-10 ft. Operator is trying to locate the source of the water.

In Vanderburgh County, G. E. Baldwin has set casing to 2,291 ft. at 1 H. E. Boyle, NW NW SE 32-4s-10w, about 8 miles north of Evansville. Operator will test the Aux Vases at 2,248-53 ft. and McClosky at 2,296-2,304 ft.

R. H. Compton has another producer in southwest Spencer County at 1 R. Montgomery Heirs, SE SW NW 31-7s-7w, with production of about 35 bbl. per day from the McClosky at 1,702-09 ft. Pay was treated with 2,000 gal. of acid. Compton & Ellis recently completed 1 Montgomery-Elbe, 19-7s-7w, for 50 bbl. per day from the McClosky.

INDIANA SUCCESSFUL WILDCAT

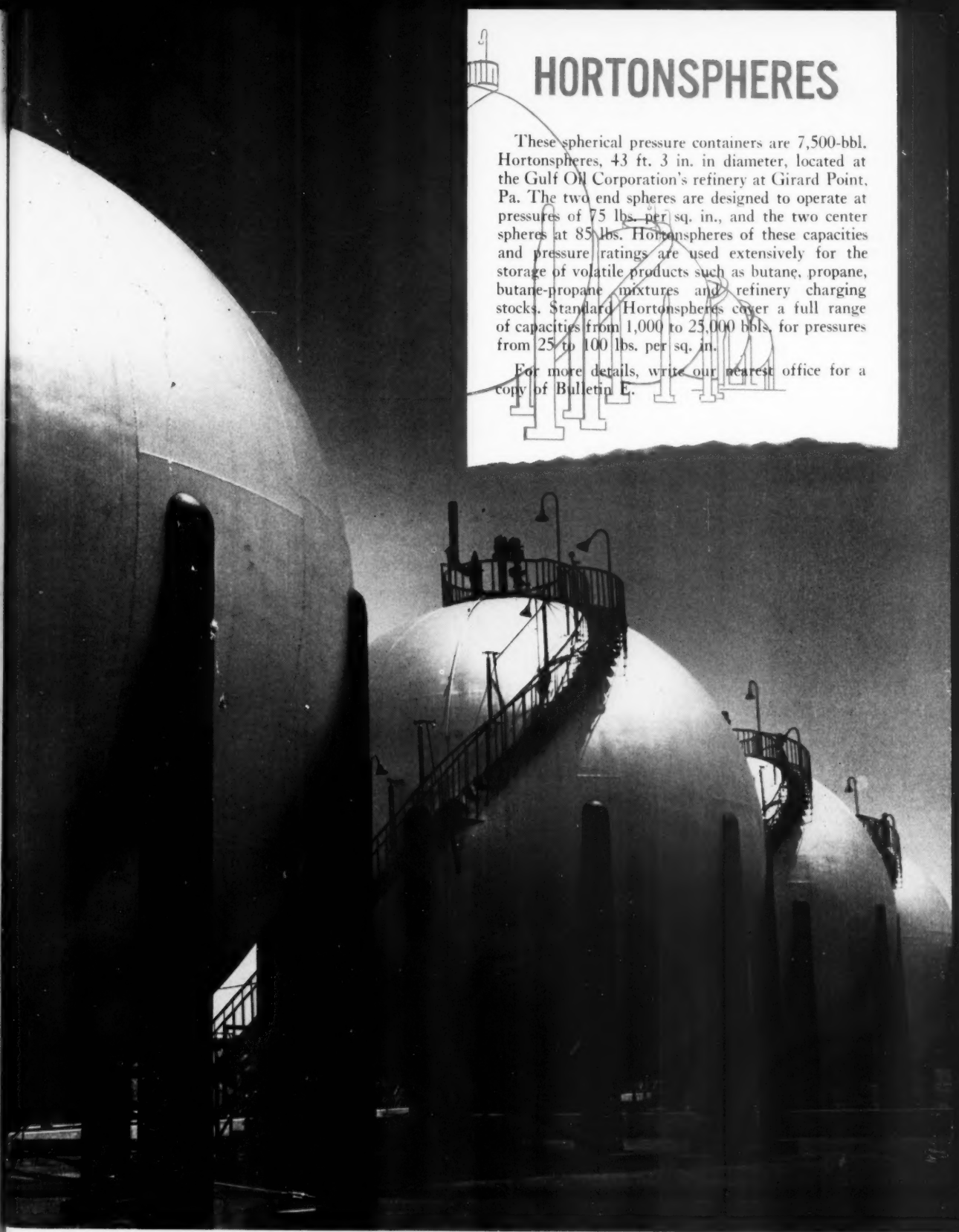
Huntington County: Stanley Vegars 1 Clifford Jones, NE NW NW 17-26n-10e, IP 30 bbl., Trenton lime 984-1,006 ft., TD 1,006 ft. (Discovery well for Warren pool.)

INDIANA WILDCAT FAILURES

Gibson County: Ashland Oil & Refining Co. et al 1 George S. Heidt, NW NW NW 8-4s-10w, dry, TD 2,371 ft.

Posey County: Cherry & Kidd et al 1 M. Glaze Estate, NE SE SW 2-4s-14w, dry, TD 3,023 ft.

Sullivan County: Joe Linzy 1 L. Haden, NE NE SW 6-8n-8w, dry, TD 2,244 ft.
C. S. Cooksey 1 Roy Whitlock, SW SW SE 23-8n-9w, dry, TD 2,428 ft.



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These spherical pressure containers are 7,500-bbl. Hortonspheres, 43 ft. 3 in. in diameter, located at the Gulf Oil Corporation's refinery at Girard Point, Pa. The two end spheres are designed to operate at pressures of 75 lbs. per sq. in., and the two center spheres at 85 lbs. Hortonspheres of these capacities and pressure ratings are used extensively for the storage of volatile products such as butane, propane, butane-propane mixtures and refinery charging stocks. Standard Hortonspheres cover a full range of capacities from 1,000 to 25,000 bbls. for pressures from 25 to 100 lbs. per sq. in.

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New York, 6 ..... 3347-165 Broadway Bldg.
Philadelphia, 3 ..... 1615-1700 Walnut Street Bldg.
Salt Lake City, 1 ..... 1525 First Security Bank Bldg.
San Francisco, 11 ..... 1254-22 Battery Street Bldg.
Seattle, 1 ..... 1325 Stuart Bldg.
Tulsa, 3 ..... 1606 Hunt Bldg.

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